JAN 4 1937

Engineering News-Record

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In the San Gabriel Canyon ground surveys of the rough terrain checked closely with those made from the air by the photogrammetric method

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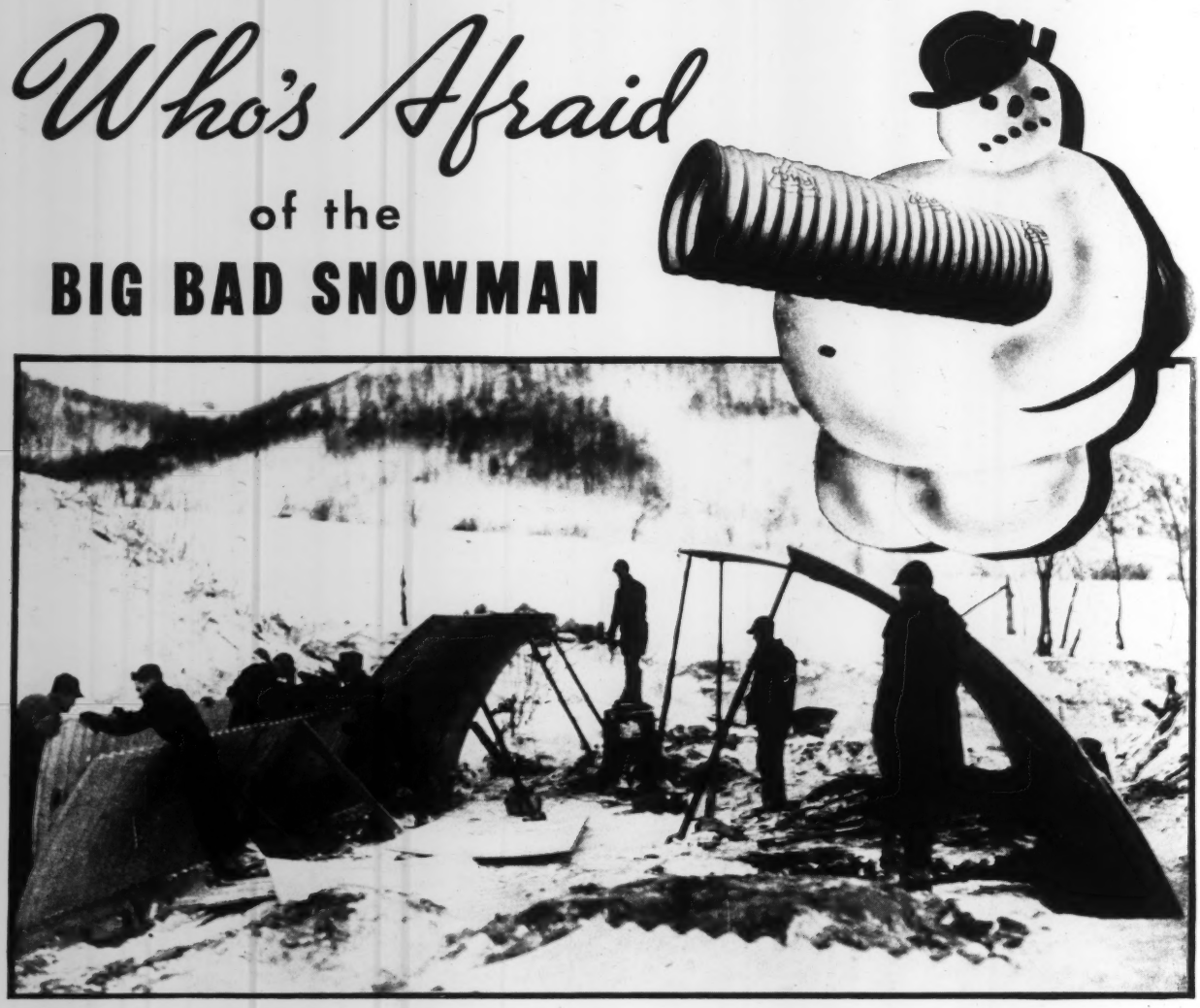
Who's Afraid

of the

BIG BAD SNOWMAN



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Happy New Year

WITH this issue another year draws to a close. For engineering and construction it has been one of consistent improvement. Its record foreshadows a new year of even more heartening progress.

Since it hit bottom in 1933 the construction activity of the nation has climbed from $2½ billion to $5½ billion. This means that it has come back something more than half way toward a reasonably normal program.

Aside from its bulk, the complexion of this activity also indicates progress toward normal conditions. Private work, for example, has shown a vast increase during the last two years and promises to continue into 1937 at an accelerated rate.

DURING the last few years construction has lived chiefly on public works, financed largely by federal aid. Although federal aid policies for the coming year have not yet been announced, there is certain to be a substantial volume of public work during 1937. Some of it will be on regular federal projects; much more will be under state and local auspices. On the latter we may expect a continuance of the present well-marked trend toward less federal participation and a corresponding greater reliance by local communities on their own resources.

In every department of engineering and construction, from dwellings to factories, from private structures to public works, the nation is short of its normal complement of capital facilities. If we are to resume and maintain the standards of private and community living accepted as normal by the American people, we must continue to make up that shortage. We must compensate for the deficiency indicated by that startling dip in the curve of fixed investment that began in 1929, reversed in 1933 and has yet to reach the normal plane on its way up.

Today we have that job in process, and whatever may be our immediate problems and however involved they may appear close up, nothing is more certain than that they must be solved and will be solved as we proceed.

SO we enter 1937 with a certainty that we are well embarked on the up-swing of a long-term construction cycle. With 1936 total volume closing at about 80 per cent of 1926, and at but 60 per cent of 1929, we are aware of a continuing need. With administration and finance turning from emergency to normal practice, we sense a greater stability. With a steady resumption of forward planning by both public and private agencies, we look forward to more sustained employment. It is quite possible that a year hence the substantial bulk of the engineers and constructors of the nation will be back at their regular jobs, once again serving through normal channels the industrial, commercial and community progress of the American people.

In view of all this, it is with more than the usual confidence that this page wishes for the engineering profession and the construction industry and for every individual affiliated with them or dependent upon their work, a Happy New Year.

Willard Chevalier

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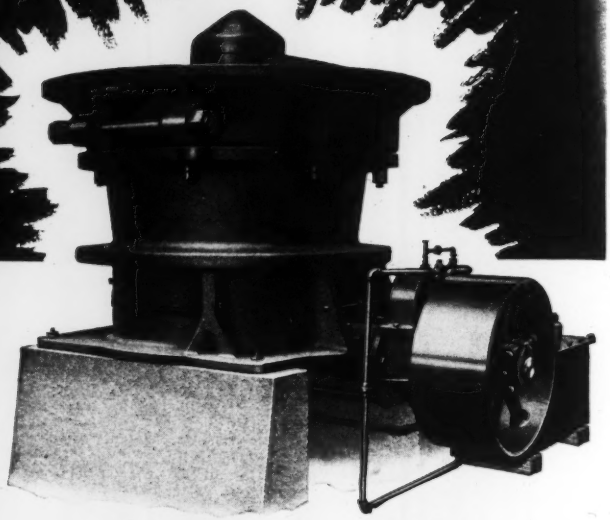
Speed Up



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■

An Index for Volume 117, July-December 1936, will be published with the issue of January 14.

Next Week—The Annual Highway Number—A group of authoritative articles on Present Highway Design Practices.

Exactly what they wanted

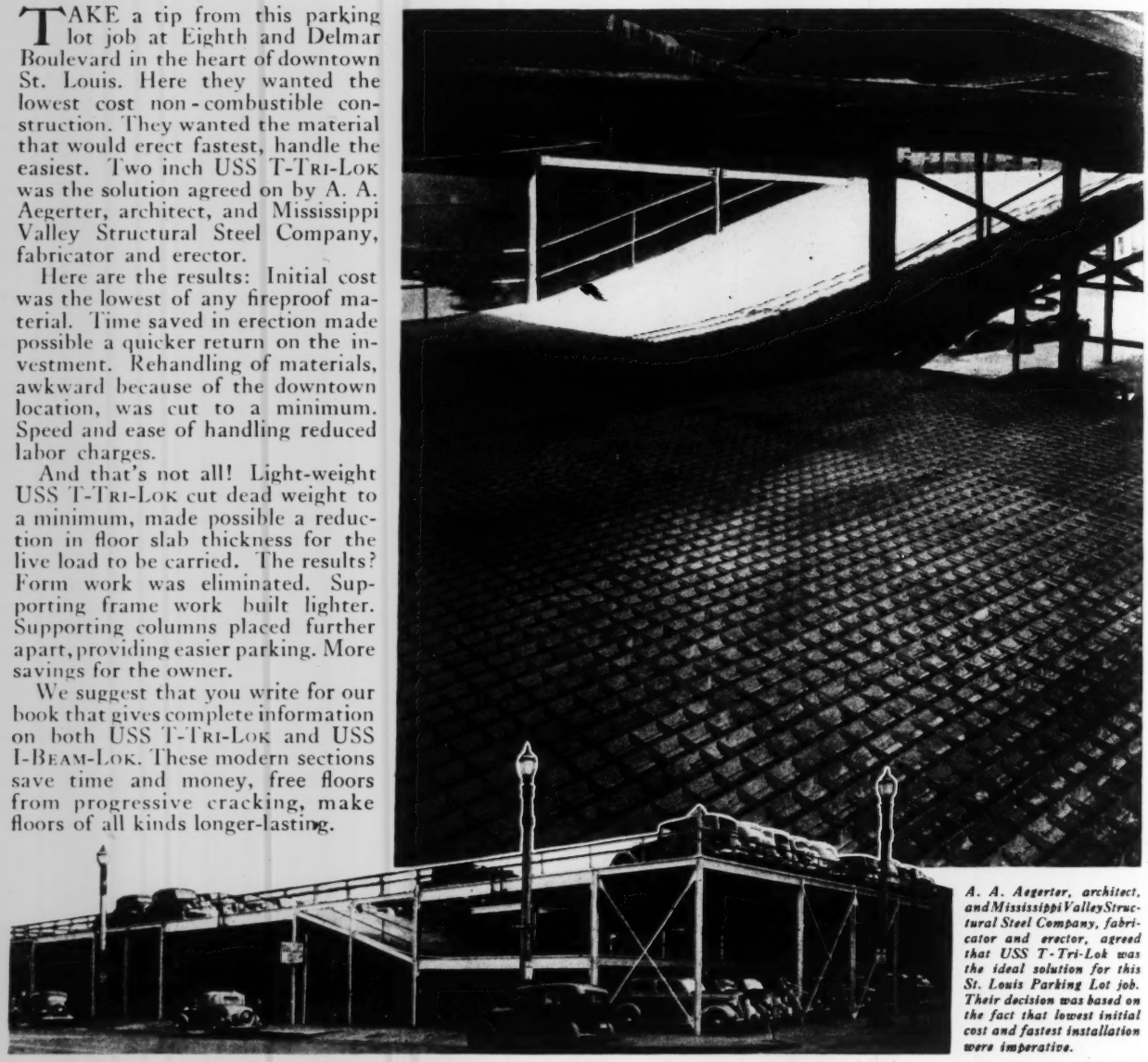
SPEED and ECONOMY

TAKE a tip from this parking lot job at Eighth and Delmar Boulevard in the heart of downtown St. Louis. Here they wanted the lowest cost non-combustible construction. They wanted the material that would erect fastest, handle the easiest. Two inch USS T-TRI-LOK was the solution agreed on by A. A. Aegerter, architect, and Mississippi Valley Structural Steel Company, fabricator and erector.

Here are the results: Initial cost was the lowest of any fireproof material. Time saved in erection made possible a quicker return on the investment. Rehandling of materials, awkward because of the downtown location, was cut to a minimum. Speed and ease of handling reduced labor charges.

And that's not all! Light-weight USS T-TRI-LOK cut dead weight to a minimum, made possible a reduction in floor slab thickness for the live load to be carried. The results? Form work was eliminated. Supporting frame work built lighter. Supporting columns placed further apart, providing easier parking. More savings for the owner.

We suggest that you write for our book that gives complete information on both USS T-TRI-LOK and USS I-BEAM-LOK. These modern sections save time and money, free floors from progressive cracking, make floors of all kinds longer-lasting.



A. A. Aegerter, architect, and Mississippi Valley Structural Steel Company, fabricator and erector, agreed that USS T-Tri-Lok was the ideal solution for this St. Louis Parking Lot job. Their decision was based on the fact that lowest initial cost and fastest installation were imperative.

U·S·S T-TRI-LOK

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ENGINEERING NEWS-RECORD

December 31, 1936

FIG. 1—DAM SITE at San Gabriel No. 1, looking upstream, before construction began. This shows character of the terrain surveyed.

Photogrammetric Surveys Give Dam and Quarry Yardage

Maps made with airplane equipment agree closely with ground surveys in San Gabriel Canyon—Costs relatively low—Special equipment essential

By Paul Baumann

Junior Assistant Chief Engineer, Los Angeles County Flood Control District

FIVE PHOTOGRAMMETRIC surveys have been made recently in San Gabriel Canyon for the Los Angeles County Flood Control District. In each case a check survey has been made by the usual ground methods and thus it is possible to say definitely that results by the two methods agree very closely. The sped with which work is done and the comparatively low cost of surveys made with airplane equipment have made it well worth while to employ this method. An outline of the different purposes served, the nature and the cost of these several survey projects are given in the following.

Because photogrammetry, as a part of descriptive geometry, is an exact science, there was no hesitation on the part of the district in employing it on work requiring great accuracy. In the form in which it has been used in terrestrial surveying with fixed base lines it was much more simple than by methods adapted to airplane use. However, in recent years precise instruments developed for aerial surveys have made it possible to greatly increase their accuracy. One limiting element in the aerial work is that it can be done with precision only when using special equipment, which involves a considerable investment, and provided trained operators of great skill and rare optical faculties are available. The camera used in the airplane is a combination instrument which makes five simultaneous exposures (*ENR*, Sept. 5, 1935, p. 342). Both the stereo comparator and the stereo planagraph were used.

Of the five surveys the first was for the purpose of locating and comparing possible dam sites. The other four all had to do with quantities of material which were calculated from the topography as represented by contours. Some of the essentials in each of the five surveys are given in Table I. It was held desirable to make two or more independent surveys of the same area in these several cases as an insurance against controversy and accusations possibly leading to arbitration or litigation caused by disagreement in the estimates of pay quantities. This policy was established by the district for the abandoned Forks site and has been followed since on all major contracts.

The first aerial survey was in the nature of a reconnaissance for locating suitable dam sites on the West Fork and the East Fork of the San Gabriel Canyon above the No. 1 dam site. The control system for this survey was established by district survey parties and was such as to include the area between the bottom of the canyons and approximately El. 400 ft. above. Results of the survey were plotted in map form for study.

TABLE I — ESSENTIAL FIGURES ON FIVE PHOTOGRAMMETRIC SURVEYS

Survey Number	Purpose	Date	Scale Ft. per in.	Contour Int. (ft.)	Result with aerial map	Result of ground survey	Discrepancy (per cent)
1	Locate dam sites	Nov. 1929	400	50	197,486 acre-ft.	199,915 acre-ft.	1.2
2	Calculate excavation or fill	Apr. 1932	20	5	4,115,402 c.y.	4,135,816 c.y.	0.496
3	Calculate excavation or fill	Feb. 1933	30	5 and 2.5	525,000 c.y.	525,893 c.y.	0.170
4	Calculate excavation or fill	Mar. 1933	30	5	2,187,762 c.y.	2,201,028 c.y.	0.60
5	Calculate waste	Sept. 1935	30	5	1,440,221 c.y.	1,444,301 c.y.	0.28

TABLE II — COMPARISON OF HORIZONTAL VARIATIONS

			Variation Normal to Slope	
	Difference in Areas Between Contour and Base Grid	Average Contour Length	Excess in Ground Survey Over Aerial Survey	Excess in Aerial Survey Over Ground Survey
Contour El.	(sq. ft.)	(ft.)	(ft.)	(ft.)
East Abutment				
1,450	377	916	0.23	....
1,425	150	1,049	0.09	....
1,400	239	1,310	0.11	....
1,375	427	1,414	....	0.19
1,350	121	1,848	....	0.04
1,325	599	2,157	0.18	0
1,300	540	2,257	....	0.15
West Abutment				
1,500	0	234	0	0
1,475	328	700.5	0.19	....
1,450	271	832.5	....	0.13
1,425	28	963	0.01	....
1,400	121	1,147.5	0.04	....
1,375	534	1,176	0.18	....
1,350	214	1,257	....	0.07
1,325	307	1,419	0.09	....
1,300	826	1,677	....	0.19

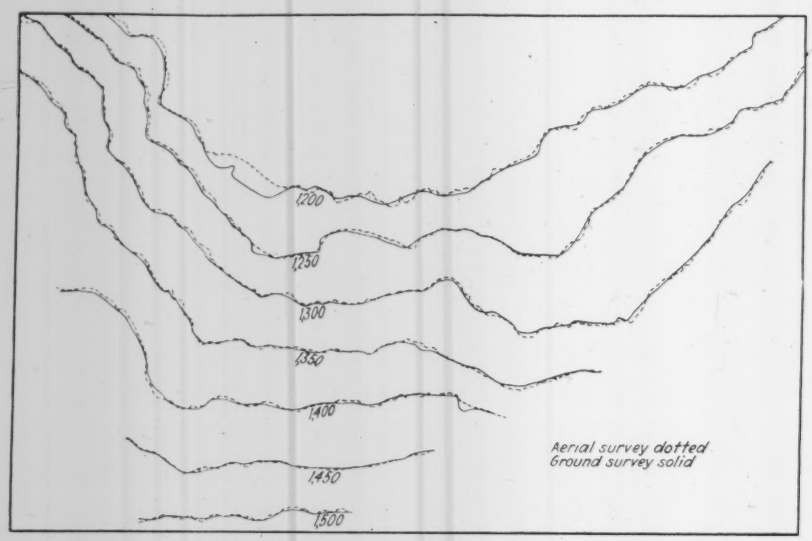


FIG. 2—CONTOUR MAP showing small discrepancies between aerial and ground surveys.

The site for San Gabriel Dam No. 2 in the West Fork was studied from this map in a preliminary way. The map also included the entire reservoir site above dam No. 1 which later was partly checked by a stadia survey plotted on the same scale, between El. 1,400 and 1,800 (elevation of streambed at dam No. 1, approx. 1,190). The volume of water stored between these two elevations was calculated from the two maps with the result shown in Table I. The width of canyon mapped averaged 2,000 ft. and the cost per mile for the aerial survey was $66. No particular degree of accuracy was contracted for in this instance.

Survey No. 2 was made to create a topographic map of No. 2 dam site as a basis on which to calculate quantities. The requirement of accuracy was that quantities calculated from the aerial map should check quantities calculated from field surveys within five per cent. This survey included approximately twenty acres. The discrepancy of 0.496 per cent between maps based on ground and on aerial surveys is believed to have been caused in part by expansion of the tracings. In all probability the actual check between the two maps was closer than the percentage given.

The third survey, made at San Gabriel No. 1 dam site, covered approximately 65 acres and was used as the basis for a map from which quantities of excavation and fill could be calculated. The requirements were for a scale of 1 in. to 30 ft. with a contour interval of 5 ft. except in the streambed where the interval specified was 2.5 ft. The contract on this map guaranteed that it would have an accuracy as follows:

"In any horizontal area measuring 100 ft. on each side, the average ground surface as depicted on the topographic map shall not vary more than 0.75 ft. from the true surface of the ground, said variation to be measured normal to the ground surface."

The same area covered by survey No. 3 was mapped by two independent ground crews, one from the field office and one from the main office. In these ground surveys the most accurate methods were used; in addition to combination level and transit parties, making measurements with steel tape, where steep slopes made chaining difficult, two transits were used for simultaneous observations by the intersection method. From the notes of these two surveys, maps were made on the same scale as the aerial maps both in and above the streambed limits. Comparison of results in calculating yardages from the three maps gave the following results:

In the west abutment, where the total quantity involved was about 400,000 cu.yd., excavation as computed from the field office map gave 1,177 cu.yd. less than excavation computed from the main office map, and 2,326 cu.yd. less than quantities computed from the aerial map. In the east abutment, where the quantity involved was on the order of 125,000 cu.yd., excavation as computed from the field office map gave 3,440 cu.yd. less than that computed from main office map, and 1,398 cu.yd. less than that computed from the aerial map. The survey made by the main office was carried out with very careful attention to detail and probably gave a higher degree of accuracy than the survey made by the field office.

Comparison of main office ground survey with results of aerial survey showed, in the west abutment, main office results 1,149 cu.yd. less than the aerial survey (0.28 per cent) and in the east abutment 2,042 cu.yd. more than the aerial survey (1.63 per cent). Discrepancies as combined for the two abutments are shown in Table I. It is to be noted that quantities computed from the aerial map are between those computed from the two ground surveys and are closer to the one regarded as the more accurate of the two. There was some erosion between the dates on which these surveys were made which would account for small discrepancies. The cost of aerial survey No. 3 was $45 per acre.

The fourth photogrammetric survey covered an area of approximately 64½ acres with requirements substantially the same as for survey No. 3 and was used in checking pay quantities. The cost of this survey was $61.50 per acre.

Survey No. 5 covered the San Gabriel No. 1 dam site, the quarry area and the waste dump area as a check on calculations of pay quantities made from ground surveys. The total area included was approximately 171 acres; requirements were the same as for survey No. 3.

In this case maps from aerial and ground surveys were combined as the area included nearly vertical cliffs and some overhanging rock, particularly along the east and west abutments. Also a check was made by comparing the aerial map with results of the main office survey, using 25-ft. contour intervals. The areas between the contours of each map and the common coordinate grid system were calculated. The difference for areas obtained for contours common to each map divided by the average contour length between the limits considered, gave an average horizontal variation between the contours of the two maps. This horizontal variation then was reduced to a variation normal to the average slope of the ground surface. The results obtained by this method of comparison are given in Table II.

In survey No. 5 the aerial work was done some six months after the ground survey so doubtless part or all the discrepancy could be charged to shrinkage and surface erosion. The cost of this survey was $79 per acre.

All the aerial work was done under contract by the Fairchild Aerial Surveys, Inc., and with the exception of survey No. 1 the control system was established by the contractor. Acknowledgment of valuable assistance in preparation of this article is due N. B. Hodgkinson, senior engineer, and W. H. E. Dunham of the design department, in charge of quantity estimates, Los Angeles County Flood Control District.

Prediction of Runoff Aided By Grouping Rainfall Data

Combining the records of areas possessing uniform rainfall characteristics to produce a single record for the total number of years covered makes possible long-range prediction of excessive precipitation

By C. H. Eiffert

Chief Engineer, The Miami Conservancy District Dayton, Ohio

IF ENGINEERS could predict the amounts and variations of runoff in advance, their problems of water control would be greatly simplified. However, precipitation varies greatly from season to season, from year to year, and in different regions. Runoff being a part of precipitation varies with it, but for a number of reasons does not vary directly as the precipitation. There are certain factors which affect water between its precipitation and runoff which tend to make runoff a much more uncertain quantity than precipitation. While runoff bears a direct relation to precipitation, its percentage is affected by the nature and condition of the terrain upon which the precipitation occurs. The percentage and rapidity of runoff will vary greatly, from the same area, with the season, the water content of the soil, its condition as to frost, or ice and snow and the type and condition of the vegetation. From different areas where the precipitation may be the same, the runoff may vary greatly in accordance with topography, geological formation, shape of drainage area, etc.

Because of these variations it is rather obvious that the runoff problem is not susceptible of solution by means of strictly mathematical formulas. It seems obvious also that the principal factor in determining the amount of runoff, whether annual, seasonal or peak, must be the precipitation. Furthermore, existing records of precipitation are much more complete and cover a longer period of years than runoff records. For these reasons our first step in estimating runoff must be to make the best possible use of the precipitation records.

Miami district studies

It should be evident that if we can determine the frequency of various intensities of rainfall, we are much better able to estimate runoff, discharge peaks, and their frequency. It was for this reason that, when the studies for the Miami Conservancy District flood control were undertaken, an unprecedentedly thorough and complete analysis was made of all precipitation records for the eastern portion of the United States.

The results of these studies were later published as "Storm Rainfall of Eastern United States," Part V of the technical reports of the district. The excessive precipitation data utilized in this report included all available records from the earliest of such records through the year 1914. There has been considerable demand for this volume and recent water control activities appeared to justify a revised edition in which excessive precipitation data through 1931 and some storm studies through 1933 are included. This edition was published recently (*ENR* Aug. 27, 1936, p. 314).

Chapter V of this volume deals with frequency of excessive precipitation, making use of isopluvial charts and pluvial indices. There has been more or less hesitation to use these charts and indices. The purpose of this article is to make the data and the methods employed more helpful and to urge engineers to use and test them more extensively.

The essential feature of the method is to extend the actual periods of record by adding the years of record of a number of individual stations in a given area, and is described in Chapter V as follows:

Let us assume a number of rainfall stations, say five for convenience of illustration, located within an area possessing uniform rainfall characteristics. At station *A* complete records have been kept for a period of 70 years; at station *B*, for 40 years; at station *C*, for 60 years; at station *D*, for 80 years; and at station *E*, for 50 years, the aggregate of the period of record being 300 years. Treating this aggregate as a single record for the area under consideration, we may say that the highest rainfall intensity recorded in the entire period has occurred with a probable frequency of once in 300 years. Likewise the second highest intensity has been equaled or exceeded on an average of once in 150 years, and the third highest rainfall intensity has been equaled or exceeded on an average of once in 100 years. The process is capable of indefinite expansion, being limited only by the amount of data at hand. Thus the sixth highest rainfall intensity would have been equaled or exceeded on an average of once in 50 years; the twelfth highest, once in 25 years; and the twenty-fourth highest, once in 15 years. In this way the individual experiences of the observing stations in the given area are combined to give a weighted average, which may be regarded as the probable average experience for any one point within that area.

The method has certain limitations, and these are clearly defined in the texts, both old and new.

Method of application

The charts given in Chapter V show the frequency of excessive precipitation obtained by this method for 2-deg. quadrangles for 15, 25, 50 and 100 year periods for 1, 2, 3, 4, 5 and 6 day rainfalls. The figures or pluvial indices in the quadrangles indicate the intensity of rainfall in a given time interval that may be equaled or exceeded once in the period of years for which the particular chart was prepared.

It is recognized that the method is not mathematically precise and that its value depends upon the area on which uniform conditions may be assumed, the number of stations, and the length of their records. The writer believes that it offers the best available means of estimating frequency of excessive precipitation and to a large extent removes the limitations placed on the use of data due to short periods of record.

In this article, with the exception of one diagram for Ohio (shown in Fig. 3), only precipitations occurring in 24 hours have been considered.

For every storm there is a maximum rainfall which occurs at one station. For any area having a uniform climate and uniform rainfall conditions, where a certain number of rainfall stations are uniformly distributed, all stations have equal chances to have a certain intensity of rainfall in a certain period of time. It is obvious from only a casual inspection of rainfall records that the record of one station for 50 or even 100 years will not include all possible variations for that station, but if we have a number of stations on an area with the same climatic conditions, we increase the probability of including all variations in approximately the ratio of total years of record of all the stations to the years of record of the one station. For instance, it may be that at a given station a rainfall of 4 in. or more in one day has occurred on the average of once in 10 years. Then if the average rainfall conditions are the same throughout the area under consideration, every station in that area has the same chance of having this 4-in. or greater rainfall once in 10 years. Therefore in an area having 10 stations we should have a similar chance to have this same rainfall 10 times in 10 years. One station alone would have exactly the same chance to have it 10 times in 100 years or 10 stations may have a total of 100 occurrences in 100 years. From this we may reason that if we have the above mentioned area with 10 stations, each station having 10 years of record, we may combine the years of record, making a total of 100, and say that any storm intensity that has been recorded a certain number of times in the area in the 10 year period has an equal chance of occurring the same number of times at any particular station in 100 years.

This reasoning would seem to be correct provided that (as stated) rainfall conditions may be considered the same for the entire area during the entire period and that similar conditions will continue in the future. We know, of course, that we may have a series of wet or dry years and periods of years during which rainfall gradually increases or decreases, and, if we take as a basis a short period during an extreme, our results will not be satisfactory. The longer the period of record the better will be the results. Many of our records now have been kept from 50 to 100 years. If we have a number of stations in the same area, this is probably long enough to include nearly all possible variations. Therefore for a given area we should be able to combine the years of record and calculate with a fair degree of accuracy the frequencies for any station during a period equal to the sum of the years of record of all stations within the area.

FIG. 1—LOCATIONS of the 172 gaging stations in Iowa and of the eighteen gaging stations use in computing the curves in Fig. 2

We cannot take the record of one station and project it into the future. If, for instance, we happen to have a rainfall in a 10 year or 25 year period which is the largest in 100 years, our results would be very misleading. With the use of a large number of stations, this difficulty is greatly reduced if not eliminated.

To test the reasoning above stated the 1-day rainfall records of 4 in. or over at all stations in the State of Iowa have been tabulated. There are, in Iowa, 172 stations, the total years of record for all of them being 4,810. The result of this compilation is shown in the following table:

TABLE I—OCCURRENCE AND FREQUENCY OF ONE-DAY RAINFALLS IN IOWA

Rainfall greater than	No. of Occurrences	Frequency
4 in.	471	11
5 in.	154	31
6 in.	67	72
7 in.	30	160
8 in.	17	283
9 in.	14	343
10 in.	7	687
11 in.	4	1200
12 in.	3	1600

Frequency = once in number of years shown = $\frac{4,810}{\text{Number of occurrences}}$

Next, the same process was carried out with the records for 18 stations or approximately 10 per cent of all stations. The map, Fig. 1, shows the locations of all stations and of the eighteen stations used. The results for the eighteen stations, with a total of 616 years of record, are tabulated below:

TABLE II—FREQUENCY OF RAINFALLS AT EIGHTEEN SELECTED STATIONS IN IOWA

Rainfall greater than	No. of Occurrences	Frequency
3.5 in.	99	6
4 in.	56	11
5 in.	16	38
6 in.	6	103
7 in.	4	154
8 in.	2	310

These results are shown graphically in Fig. 2. The two curves agree very closely and tend to show that if records had been kept at one station for 616 years or for 4,810 years the curves would be approximately the same as those shown. The graph representing the greater number of stations and years of record should be the more dependable for a given frequency. True, it is somewhat idle to speculate that a rainfall of 11 in. in 24 hours may occur at any particular locality once in 1,000 years, but with this number of stations and total years of record, the results, for, say once in 50, 100 or 200 years, should be fairly dependable. That is considerable more than we can say if we use the record for one station.

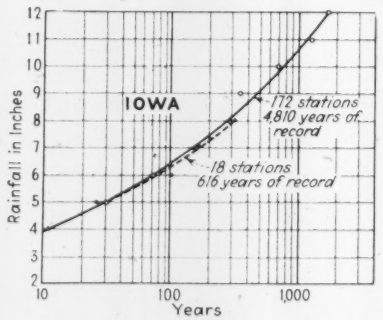


FIG. 2—COMPARISON of frequency of one-day rainfall from all stations in Iowa with those of ten per cent of the stations

The data for Iowa are used purely as an illustration. It is probably too large an area to be represented by one curve. The records indicate that excessive precipitation occurs more frequently in the southern part of the state; however, the difference on a frequency per station basis is not as great as a casual inspection of the records would indicate because there are a greater number of stations in that part of the state. Probably a more logical method for actual use would be to divide the state into three strips, crossing it in an east-west direction. Satisfactory results have been obtained for other states.

Modifications of the method

This method may be modified as to areas, length of precipitation period, and seasons or months to any degree desired. Care must be exercised in selecting geographical divisions so as not to include in the same area localities with great difference in altitude or other physical characteristics affecting precipi-

tation. It may not be possible to use the method satisfactorily in some mountainous sections.

With runoff as the ultimate end in view, curves may be prepared for each season of the year, and for various duration of precipitation, for any area in which the conditions governing precipitation are uniform.

The problem of estimating runoff and flood discharges is an extremely difficult one and there may be many a slip betwen rainfall and runoff, but with the frequency of excessive precipitation established with a reasonable degree of accuracy, we have a most important fundamental factor for further calculations.

Time of Maximum runoff

We cannot assume that the maximum rainfall for a given period of time will produce the maximum runoff in any given drainage area. It would do so only if the area were frozen or saturated to such an extent that the runoff would be 100 per cent or nearly so, of the rainfall. Runoff records of 100 per cent do occur, but it is highly improbable and in some cases quite impossible for the maximum rainfall to occur simultaneously with 100 per cent runoff conditions.

As an illustration, in Iowa with 4,810 years of record there are seventeen occurrences of more than 8 in. of precipitation in 24 hours (maximum 14.61 in.), all of which occurred in June, July, August and September. Of these, four occurred in June, three in July, nine in August and one in September. It is clear therefore that the maximum 24-hour precipitations in this region come during the growing season when evaporation and transpiration are at a maximum. One hundred per cent runoff from such storms is practically impossible, and storms of lesser magnitude occurring at other seasons may produce greater quantities and peaks of runoff.

Local studies needed

After making a considerable study of rainfall and runoff records, the writer feels convinced that engineers should make more such studies in their own localities or regions, rather than follow precedent or use runoff formulas. Curves or tables may be prepared which show the frequency of various intensities of precipitation for periods of any desired length. Calculations for periods of less than 24 hours will be somewhat uncertain because of the small number of stations having recording rain gages. A very valuable study for periods of 24 hours or less was made available recently in the form of Miscellaneous Publication No. 204, U. S. Department of Agriculture, "Rainfall Intensity-Frequency Data" by David L. Yarnell (*ENR* Feb. 27, 1936, p. 327). This utilizes the data from the U. S. Weather Bureau recording rain gages for the entire United States. It should be of great assistance in the design of water control structures on drainage areas where the time of concentration is 24 hours or less.

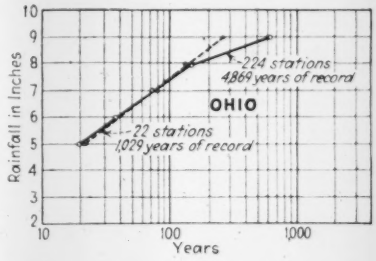


FIG. 3—FOUR-DAY RAINFALL frequencies from all stations in Ohio compared with frequencies from ten per cent of the stations

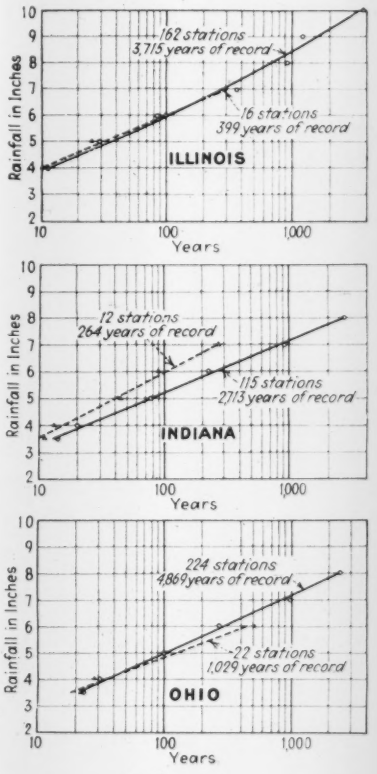


FIG. 4—FREQUENCY of one-day rainfalls for all stations in Illinois, Indiana and Ohio compared with that of ten per cent of the stations

While the data we now have are far from being as complete as we would like to have them, it is imperative that we try to make the best possible use of them. However, in this connection it is desirable to emphasize the necessity of securing additional data and records by the government bureaus and all engineers connected with water resources or control investigations. These will assist in establishing rainfall-runoff relations. No prediction or estimate, however carefully worked out, can take the place of an actual record.

To secure additional information necessary for this purpose two requirements should be met:

First, it will be necessary to install a large number of recording rain gages to obtain duration and intensity of precipitation; second, additional automatic river-stage recorders will be required. The installation of the two should be properly coordinated, which will mean cooperation of Weather Bureau, U. S. Geological Survey and other agencies. It would be desirable to have all large drainage areas in the country properly equipped with these instruments. If that cannot be done, good results could be obtained by installing the necessary gages on a number of representative drainage areas. One requirement would be to make the installation permanent so that records could be obtained over long periods. We are rather poorly equipped with data for some of the extensive water control studies now being carried on. Our Weather Bureau, U. S. Geological Survey, U. S. Engineers, and others started keeping records principally for purposes which did not include many of the uses now being made of the records. For instance, rainfall records were originally kept principally as an aid to agriculture. In order to make the data meet present day requirements it will be necessary to break through and away from some of the traditional methods.

For about 25 years all rainfall records of the U. S. Weather Bureau have been published in "Climatological Data" and in the Annual Reports of the U. S. Weather Bureau. These publications are deserving of more extensive use among engineers.

Indiana Pushes Installations Of Highway Safety Devices

FLASHER SIGNALS on 211 highway railroad intersections will be in place on dangerous grade crossings in Indiana when the State Highway Commission completes a new installation of 161 new signals early next year. This program of signal protection resulted from allocation of federal funds.

As an experiment, four types of center line markers covering 1 mi. each are being installed on the four-lane roads between South Bend and the Indiana-Michigan line. The state has 100 mi. of these wide roads. The intent is to divide the 40-ft. width into two 20-ft. lanes to separate opposing traffic. The types are as follows: (1) Cat-eye reflectors; (2) short transverse corrugated metal strips which give a bumping sensation as a vehicle passes over them; (3) low half-moon shaped strips of corrugated metal also to give the bumping sensation; (4) a low rounded concrete curb.

Three-Hinge Timber Arch Bridge Built by CCC in Oregon

Highway bridge of 135-ft. arch span designed to make fabrication and erection as simple as possible, built with inexperienced labor on North Umpqua River

By William D. Smith
Associate Structural Engineer, U. S. Forest Service, Portland, Ore.

SIMPLICITY of design and detail are outstanding features of the highway bridge with a 135-ft. arch span recently completed by the U. S. Forest Service in the Umpqua National Forest about 45 miles east of Roseburg, Ore. The main span is a three-hinged, spandrel-braced arch using treated timber for tension members as well as for those under compression. The few bridges of similar construction which have been built heretofore have had more complicated details and hence have been comparatively difficult and expensive to fabricate and erect. In this structure the design was developed with a view to making the details as simple as possible without sacrifice of strength or rigidity. All joints were made with split-ring connectors.

Because the bridge crosses the North Umpqua River in the heart of an important recreational area it was necessary to select a design that would harmonize with the natural setting. Three other factors influenced the type of bridge to be chosen; the need for economy, the 45-mile truck haul from the nearest railroad and the need for simple procedure in assembly and erection so the work could be carried out by CCC boys, the only available labor.

Preliminary studies were made of a suspension bridge and on three types of timber bridges: a Howe truss, a two-hinged spandrel-braced arch and a three-hinged spandrel-braced arch.

The suspension bridge would have been acceptable in the matter of appearance but it had to be rejected on account of cost. The Howe truss appeared to be the most economical in material but the appearance was against it and danger to falsework during high water would have made it necessary to postpone erection until after the spring floods. The arch types, on the other hand, not only were more economical but were found to fit the bridge site effectively and to give a very pleasing appearance.

Choice of the three-hinged arch in preference to the two-hinged type was based on erection considerations. With the available erection equipment and the limited assembly space it would have been impracticable to assemble a full truss and lift it into place as a unit. Thus the erection of this type would have necessitated false work. With the three-hinged type it was possible to assemble the arch trusses in halves and then to use a cableway to place each half truss as a unit, thus entirely eliminating falsework.

The design finally selected called for a three-hinged, spandrel-braced arch supporting floorbeams, stringers and a laminated deck 14 ft. wide with a 3-ft. sidewalk on each side. The main span of 135 ft. is flanked on each end with three approach trestle spans of 16 ft. 10½ in., the same length as the panels in the arch. This makes the side elevation symmetrical and presents a very pleasing outline.

Design

Foundations for the trestle bents are concrete pedestals and the arch abutments are concrete on rock foundations. The structure was designed for the standard H-15 loading plus a total of 75 lb. per lin. ft. for the sidewalks. The arch ribs are divided into eight panels each 16 ft. 10½ in. long. The top chord was given a 3-in. camber at the center. The bottom chord has a rise of 24 ft.

FIG. 2—TIMBER SHRINKAGE resulting from creosoting which affected bevel cuts at joints.

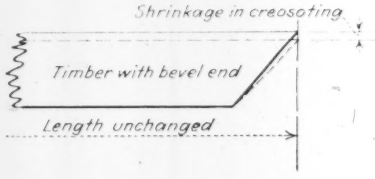
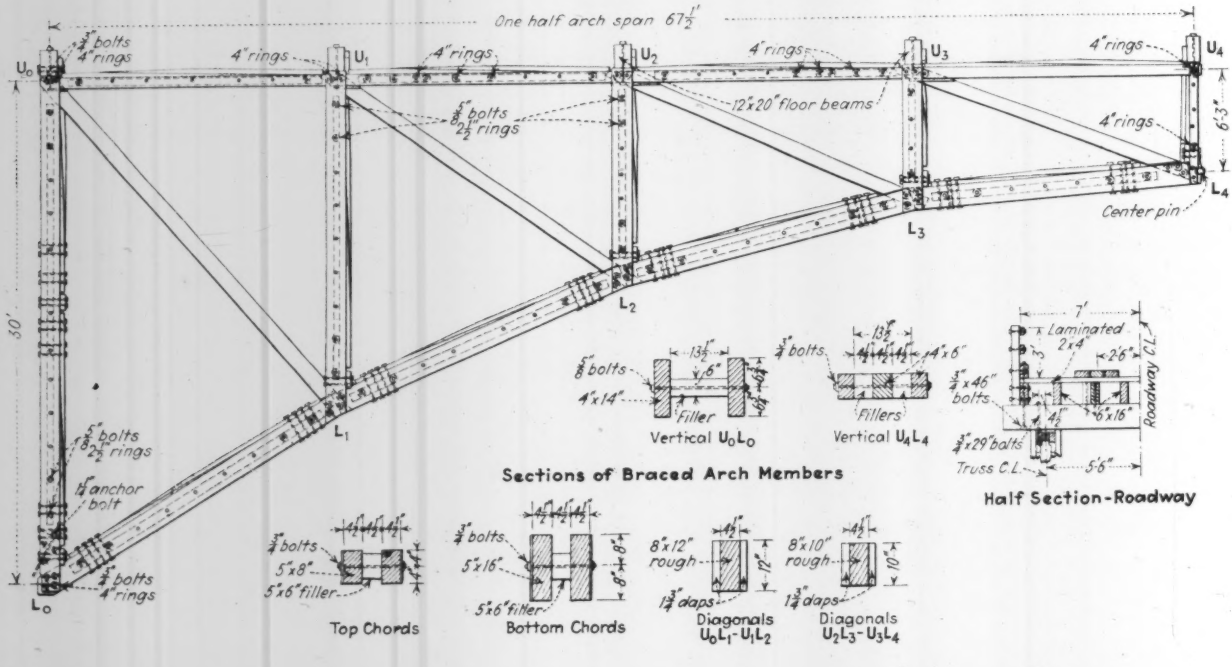


FIG. 1—ARCH RIB ASSEMBLY with cross-sections showing details of braced arch members.



The truss depth at the ends is 30 ft. and at the crown is 6 ft. 3 in. As the bottom chord is parabolic in shape, the top chord and web members have no stress under dead load or uniform live load; the only stress occurs under eccentric live loads. This lessens the requirements on truss joints, and simple ring-connected joints carry live load stresses safely.

The deck, which is made of laminated 2x4s, is carried by eight lines of 6x16-in. stringers. These, in turn, rest on 12x20-in. floorbeams which carry the load into the arch trusses at each panel point. Top and bottom chords and vertical web members are composed of three pieces combined to make an H-shaped section. For simplicity in details and shop fabrication, the top chord has a uniform section in all panels and is composed of two 5x8-in. side pieces, with a 5x6-in. filler running as close to the panel points as the details allow. This assembly is bolted at approximately 24-in. centers throughout its length. The top chord side pieces are spliced near the center of a panel and the butts are staggered. At each butt the opposite side piece is therefore solid and only one splice timber is required. The filler piece was used as this splice which eliminated an unsightly splice piece on the side of the chord, leaving it smooth on the outside.

The bottom chord consists of two 5x16-in. side pieces with a 5x6-in. filler. At the panel points, the chord side pieces are bevelled to butt against adjacent chord pieces. As the bottom chord is in compression under all conditions of loading, these butt joints will always be in contact and will transfer the chord stress through end bearing without use of splices. The joint is held in place by the vertical and diagonal members which are interlaced with the chord side pieces and connected to these pieces with split rings designed to carry their stress to the chord.

FIG. 3—CREOSOTED TIMBER ARCH of 135-ft. span framed with split-ring connectors and erected over the North Umpqua River in Oregon.

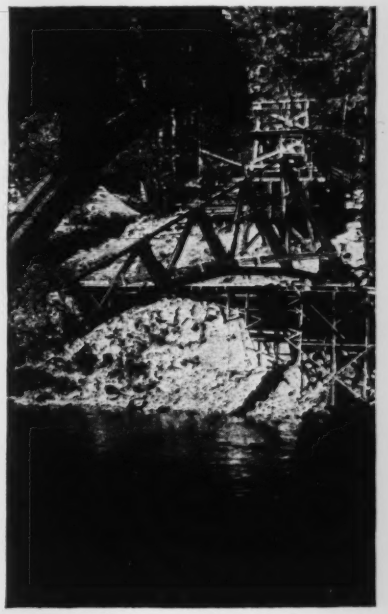


FIG. 4—TRUSS ERECTION was done with the aid of a cableway which picked up half of each truss as a unit.

FIG. 5—ARCH ASSEMBLY was carried out on platforms conveniently located near each abutment.

The butt joints, however, introduced a practical difficulty. The initial step in the creosoting process called for boiling in a vacuum to lower the moisture content. As the water is removed the timber shrinks crosswise of the grain but not lengthwise. This shrinkage changes the slope of a bevel cut as shown in Fig. 2.

Such a change in slope after creosoting threw the butt joint surfaces out of contact. This was corrected after the trusses were field-assembled and ready to place, by making a saw cut along the joints, using a saw with a wide set, and then inserting $\frac{1}{8}$-in. galvanized steel plates with a driving fit.

Vertical web members consist of two 4x14-in. side pieces and one 4x14 filler to form an H. The side pieces lie on the outside of the chord assembly and are ring-connected with sufficient rings to develop the stress of the member. The side pieces extend $1\frac{1}{4}$ in. above the top of the top chord and the floorbeams rest directly on them. In this way the panel loads are carried directly through the verticals to the bottom chord.

The diagonals are one-piece members and at panel points they fit into the space between the chord side pieces. The main section of the diagonals was designed as a column for compressive stress. At the panel points where column action does not govern, the diagonals are dapped down to $4\frac{1}{2}$ in., the thickness of the chord fillers, to avoid an excessive and awkward thickness of chord assembly.

Ring-connected lateral trusses were used in the plane of the bottom chord. Boat-spiked lateral trusses were used in the top chord plane and all vertical members have bolted and boat-spiked sway bracing.

All H-shaped members were made effective as spaced compression members by using split rings to connect the ends of the filler pieces with the side pieces. Four $2\frac{1}{2}$-in. rings were used in each end. Ends of the half trusses at the crown are fitted with cast steel hinge castings. The center hinge is a 3-in. steel bridge pin.

All members were fully shop-detailed and in addition each truss was shop-framed and bolt holes bored while assembled in the shop. After fabrication the timber was given an 8-lb. empty cell treatment using a mixture of 50 per cent petroleum and 50 per cent grade 1 creosote.

Erection procedure was as follows: One-half a truss, weighing 7 tons, was assembled and bolted up, flat, on an assembly platform. It was then picked up by two blocks operating on a "high line," and swung into position with the aid of chain blocks from a cable stretched tight over the truss centerline. The opposite half-truss then was swung into position and both halves were lowered to the abutment seats. By means of the chain blocks, the centers were raised or lowered as required until the center pinholes were in line and the center pin driven. After lining up the trusses, the lateral and bracing systems were put in. A test load consisting of a 60-hp. tractor equipped with double drums, weight approximately 16 tons, caused a center deflection of $\frac{5}{8}$ in. Approximate quantities of materials used in the bridge are given in the table.

All erection work was done under the direction of a competent foreman by CCC boys whose age averaged 18 years. None of the boys had had any previous training in construction work, and it is a tribute to the patience and skill of the foreman that the erection was handled without injury to any of the crew.

All timber used was select structural Douglas fir, side cut. No boxed heart was allowed because of its liability to checking and warping. All of the timber was fabricated and treated at the St. Helens creosoting plant of the Charles R. McCormick Lumber Co.

R. R. Krausse was foreman in charge of construction. The writer is associate structural engineer in charge of design and construction.

QUANTITIES OF MATERIALS

Foundations —	Concrete	105 cu. yd.
Approaches —	creosoted timber	26,000 ft. b.m.
	untreated timber	3,600 ft. b.m.
	hardware	1,300 lb.
Arch span —	creosoted timber	47,000 ft. b.m.
	untreated timber	4,700 ft. b.m.
	hardware	6,000 lb.
	cast steel hinges	600 lb.

Structural Engineering Congress Entertained by Germany

American delegates report on activities of International Association for Bridge and Structural Engineering including inspection trips to German work on highways, bridges and buildings

THE SECOND CONGRESS of the eight-year-old International Association for Bridge and Structural Engineering was held in Berlin and Munich, Germany, Oct. 1-11, 1936, and proved to be quite as successful as the first congress in Paris in 1932. In the total attendance of 1,100, not including ladies, thirty-six countries other than Germany were represented by some 500 persons, of whom 110 were official delegates. The United States contingent was made up of Prof. R. H. Sherlock, University of Michigan, chairman; J. I. Parcel, St. Louis; E. E. Howard, Kansas City; and Lieut. P. N. Thompson and Capt. H. M. Underwood, Corps of Engineers, U. S. Army. Professor Sherlock and Mr. Howard have furnished *Engineering News-Record* with full accounts of the congress activities and in addition with descriptions of engineering work in Germany which was visited on the official inspection trips. They are, in effect, the authors of this report.

Nine working meetings were held at the Technische Hochschule in Berlin-Charlottenburg from Oct. 1 to 7, after which the Congress moved to Munich where the closing ceremonies were held on Oct. 11. A day and a half in Berlin and the last three days of the Congress were devoted to excursions and inspection trips to structures recently completed or under construction. Generous entertainment with receptions, banquets and opera performances absorbed all the time not devoted to engineering matters.

Themes for discussion

The papers and discussions were grouped under eight general themes. Theme 1, covered by nine principal papers and discussions, dealt with the design of steel structures with considerable attention to statically indeterminate systems and to the theories of plasticity. Theme 2 and theme 4 concerned similar considerations in relation to concrete, and were covered by twenty principal papers. Theme 3 and theme 5 dealt with design, practice and research in connection with welding, and in addition the twenty-one principal papers included brief discussions of experience with welded structures in 14 different countries. Themes 6 and 7 dealt with hydraulic structures of concrete and steel, with 19 principal papers. Theme 8 was devoted to soil mechanics, with four main papers. The time available permitted only the most abbreviated presentation but the complete proceedings of the congress will be printed and available in German, French and English. An English edition is noted on p. 937 in the Book Review Section.

The inspection trips, both by special train and bus, were admirably conducted under the personal guidance of Dr. F. Todt, inspector general of the German road system. For each journey there were provided illustrated program timetables containing brief descriptions, maps and other data.

Express highways

Considerable portions of these journeys were over completed sections of the Reichsautobahn or system of automobile express highways. The design and construction of these highways, made up of two 25-ft. separated roadways with all grade crossings eliminated, were described in *Engineering News-Record*, Aug. 27, 1936, p. 289. The highways are constructed, maintained and operated by a government corporation founded as a subsidiary of the German government railway company, so that there is close cooperation between the railways and the highways in the whole general field of transportation. Construction began in 1933 and is in general executed by contractors. In the early years a large amount of the work was done without machinery, as an unemployment relief measure, but there now appears to be no excessive amount of hand labor. At present there are about 120,000 men employed, of which some 20,000 live in about 100 construction camps, each designed to accommodate 216 men.

Continuous girders preferred

In regard to the bridges, many different types have been experimented with in an attempt to find those which are esthetically most desirable. A preference is now being shown for girder structures even where this involves the use of unusually long spans. Preference is also shown for continuous girders and for tall slender piers which are frequently faced with brick or with local stone. Across the bridges and viaducts the center strip dividing the roadway is reduced in width, but the changes in pavement alignment are very gradual.

Continuous girders with spans of 42 to 65 meters are to be seen in many structures. The central park strips afford a place for columns of overhead crossing spans although occasionally such overhead structures are of single-span type. A detail of interest is the provision in many of the deck girder bridges of a permanent traveling platform below the deck for inspection and painting. The small cost

of such a permanent scaffold would be well justified in many structures in this country, in Mr. Howard's opinion.

Plate girder 236 in. deep

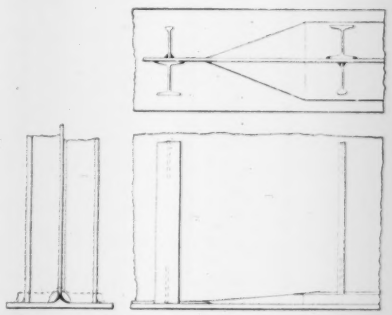
One of the outstanding girder structures is the Mangfall Bridge which carries the highway across a deep narrow valley south of Munich. This is a three-span continuous deck-girder structure with a center span of 108 meters and two side spans of 90 meters each, supported on two abutments and two columnar concrete piers about 60 meters high. The bridge has two longitudinal girders 12.5 meters center to center. The girders are 5.5 meters (18 ft.) deep necessitating a longitudinal splice through the center of the web plates. These girders were erected by cantilevering. The total width of roadway on the structure is about 21 meters, with a floor of heavy reinforced concrete.

Special welding practices

Professor Sherlock singles out the bridge at Rüdersdorf as worthy of special mention. This bridge was described by Tischer in *Zeitschrift VDI*, Oct. 3, 1936, but the author omits reference to some details which Professor Sherlock found interesting. The structure is a viaduct divided into three parts crossing adjacent valleys. It carries two trafficways on four continuous girders supported on tall piers faced with brick. The girders are welded throughout, and all welds were tested by X-ray in the shop and in the field. The distances between expansion joints are respectively 240, 339, and 400 meters. The longest spans are 66.67 meters.

The distance back to back of flange plates is 2.8 meters. The flange plates are 24x1½-in. and are rolled with a special ridge along the center where they are welded to the web plate, as shown in the accompanying sketch. The web plates were obtained in units as long as 37.5 meters; in American units the plates were about 110x13/16 in. by 123 ft. Auxiliary flange plates are provided over the piers to carry the additional moment. These plates are about 20 in. by 2¼ in. and are placed inside the main flange plates instead of outside as is usually done with cover plates. The purpose of this arrangement is to preserve the esthetic effect of the straight lines of the top and bottom flanges throughout the length of the bridge. However, it involved cutting away the stiffeners and the web plate, and machining off the ridge on the main flange plate. These details are also shown in the sketch. The auxiliary flange plates are tapered at the ends to distribute the residual welding stresses over a longer distance than would have been the case if the ends had been given a square cut.

Another interesting structure of the continuous girder type is located near Denkendorf on the stretch of the autobahn between Stuttgart and Ulm. This was described by Schaechterle in *Die Bautechnik*, Aug. 18, 1936. Its chief interest to American engineers lies in the use of steel rocker bents more than 100 ft. high. These frames have no cross bracing but depend upon the rigidity of the top girder and columns, acting as a rigid frame, to resist transverse loading. Rockers at the top and bottom of each frame permit it to swing as a pendulum when the continuous girders expand and contract under temperature. The girders are continuous over seven spans, the longest of which is 64 meters.



CENTER-RIDGE flange plates and inside cover plates characterize the design of welded plate girders used on German bridges

A number of the official representatives participated by invitation of the general director of German railways in the ceremonial opening on Oct. 5 of the Rugendamm, a bridge across the Strelasund from the mainland to the island of Rügen in the Baltic Sea. The structure is of importance in materially reducing the time of travel from Germany to Sweden by eliminating the train ferry that operated across the Strelasund.

The Strelasund is divided into two channels by the small island of Dänholm. Across the south channel there is a girder bridge of three spans, having a total length of 540 ft. with a central bascule providing a channel 95 ft. wide. Causeways or protected embankments, the "damms," extend about 1800 ft. from each side into the north channel, the central portion of which is spanned by a girder structure of ten 177-ft. spans. The embankment causeways were constructed by hydraulic dredging and are protected by steel sheetpiles and riprap. Piers in part have pile foundations and in part were sunk to rock under air.

The structure provides for a single track railway and for two-lane highway traffic. The superstructures are separate but supported on the same piers. All girder spans are half-through. The railway spans are welded and the highway spans riveted.

Building work

The largest building construction now under way in Berlin is the new Reichsbank Building. It is six stories high with two or three basements, and occupies a large block of irregular plan on a curved street. The total construction time will be about four years, one-half of which was spent on the foundations where great quantities of water were encountered, and on the reinforced concrete construction below the ground floor. Above the ground there is a steel skeleton encased in concrete, and divided in plan into twenty-seven blocks for expansion purposes. All field connections are bolted. Details in general are more complicated than in American practice, and more wind bracing is provided than is usual for buildings of this height. The construction over the main banking rooms is bomb proof.

In Munich the chief construction activity centers on the new Nazi Party buildings which are rectangular in plan with a reinforced concrete skeleton and with a rather modernistic treatment of the brown stone exterior. A short distance outside the city there is being erected an interesting building group for the housing and servicing of large numbers of buses and trucks. The group includes two fairly large apartment houses for the chauffeurs, a five-story warehouse for repairs and supplies, a central heating plant, and garages above the ground for the buses and below ground for the trucks. The roof over the trucks is bomb-proof as are the floors in the warehouse. The garage construction is unusually heavy for German practice in steel, and makes use of interesting rigid frames underground and of rigid frames and Vierendeel trusses above ground.

Professor Sherlock visited the Kaiser Wilhelm Institute for Silicate Research in Berlin-Dahlem where basic research bearing upon the development of new cements is being carried out. He also visited the Prussian Material Testing Bureau in Berlin-Dahlem, where much of the material testing for the Reichsautobahn and other projects is being done. The material testing laboratories at Stuttgart are doing most of the investigational work in concrete upon which the practices of the Reichsautobahn were based. At the Technische Hochschule in Charlottenburg an extensive program of foundation research and testing is in progress under Professors Hertwig and Casagrande and Dr. Ramspeck. Considerable attention is being given to geophysical methods of exploration, using a vibrator and a small seismograph.

Framed Concrete Residences

Rigidity, low cost, speedy erection and adaptability mark structural framing for small buildings—Forms standardized—Light-weight aggregate for insulation

By A. W. Pioda
President, Berkeley Hillside Properties Co.

RESIDENCES with structural frames of reinforced concrete, as distinct from solid concrete walls, are being introduced in California. By distributing the concrete in open construction consisting of columns, spandrel beams and floor slabs, the skeleton of the house is made similar to the structural frames used in large buildings. This frame and the solid floor slabs are poured monolithic with the result that a very stiff structure is obtained with a minimum of concrete. By embedding nailing strips of treated wood in the concrete members and by standardizing the steel forms in units which can be used in different buildings, the general scheme is made very flexible as to design. Notable features are speedy erection, a rigidity highly desirable for resisting earthquakes, adaptability to various architectural treatments and a cost very little more than for the ordinary wood frame residence.

The design uses so little concrete that if distribution were uniform the result would be a concrete thickness of only about 1 in. in the entire wall surface. Yet the structural frame has walls and columns 6 in. thick and in every way more than meets building code requirements in California. A house of this type built recently by the Berkeley Hillside Properties Co. is the first of a series of similar design planned by that company. The second house, now under construction at Atherton, Calif., is the first of a 40-house project using the same design plan.

The structural frame concrete house is believed to have all the advantages of the ordinary concrete structure with solid walls, such as resistance to fire with the attendant low insurance rates, rigidity, immunity from wood borers and the availability of flat roof surfaces for sun decks or sleeping porches accessible from the upper floor. The hollow walls afford space in which insulating material can be used if desired, and steel form units have been standardized with the idea of making them available on a rental basis to avoid the initial investment that otherwise would be required. Nailing strips of treated wood are put in the forms as they are assembled and thus are embedded in the concrete.

Column forms may be placed at any desired position in the wall and the architect has a wide range in the selection of surface finish because nailing strips are available on a spacing of not more than 16 in. A nailing buck of treated wood is placed on the under face of the spandrel beams and another is placed on the concrete floor between the columns. Between the concrete wall columns and secured by nailing to the bucks under the spandrel beams and on the floor are vertical 2x6-in. treated wood studs set on a maximum spacing of 16 in. Thus the frame of the house presents an appearance similar to that of a wood frame structure.

Bearing partitions are made the same as the outside wall frames. Nonbearing partitions may be gypsum blocks laid up in gypsum mortar or any other light construction.

Special steel forms

Since steel forms had to be designed specially, endeavor was made to combine in them speed of erection and economy. They are built to a simple pattern of pressed steel plates and five-ply plywood strips; can be rapidly assembled, placed, lined up and secured. Four standard shapes have been developed including forms for (1) side wall columns, (2) inside corner columns, (3) inside corners and (4) outside corners. There also is a standard spacer. Fig. 2 shows cross-sections of typical columns made with these standard forms. The steel and plywood members are locked in place by quick detachable clamps. To hold the vertical reinforcing bars in place in the forms, self-centering column ties are used; a type is made to suit each of the four column shapes. Two ties are used in each column; the reinforcing is wired to them and in addition is wrapped every 12 in. with fourteen-gage wire. The reinforcing cage, when assembled in this way, is dropped into a column from the open top end. Wooden nailing strips and bucks are placed within the forms when they are assembled and remain embedded in the concrete when the forms are removed. In two-story buildings the column steel is cut long enough to extend through the second floor to act as dowels for columns of the floor above.

A form set-up for a single pour includes columns, spandrel beams and floor forms. Steel I-beams for floor joists rest on the inside spandrel beam forms and are shored up from the floor below. The 2x6-in. nailing bucks which rest on the concrete floor act as the spacers between the bottom of the column forms. The nailing bucks on the spandrel beams act as spacers between the tops of the column forms and also as the bottom forms for the spandrel beams. All or part of the 2x6-in. nailing studs are nailed in permanent position between the column forms where they serve, for the time being, as shores under the spandrel beams.

Floor forms are placed between the I-beams and with the floor reinforcement the various conduits and openings for services also are placed in the forms. An entire story then is poured as a single operation. By using quick-setting cement the forms may be stripped after three days. The entire first floor of an average 6-room house can be poured in eight hours with a crew of five men consisting of two mixer men, one buggy man, one man with the vibrator and a foreman. If the floor slabs are to be hand finished, which usually is the case, two finishers are required in addition to the crew mentioned.

After stripping, the house frame is complete except for the placement of a few 2x6-in. nailing studs and framing in door and window openings. If the house is two stories in height the forms, after stripping from the first story, are reassembled for the second story and the operation is repeated.

Flexibility

Where building laws require provision for a wind load (or other horizontal force) equivalent to a horizontal loading of 15 lb. per sq.ft., it has been found that a 64-in. center to center spacing of the columns meets all requirements. Great additional stiffness is obtained by the use of corner columns and by using T-columns where a bearing partition connects with a wall. Residences of this type more than two floors in height have not yet been built.

The construction program begins with the pouring of the foundation and ground floor. All concrete up to and including the floor level is poured at once regardless of whether the floor forms are supported on the ground or

are of the suspended type using the pan system. In this first pour, dowels are set accurately in the position for each wall column (the number of dowels is the same as the number of bars in the columns) and the floor is brought to finished level for its entire area.

The next step is to erect outside scaffolding. From this the corner column forms are put in place over their respective dowels and secured in exact position by being fastened to the scaffolding. All other forms then are erected between the corner forms and are trued up in line by the use of horizontal wales which in turn are secured to the columns by form liner clamps and wedges. There are two of these wales all around, inside and outside, one pair near the bottom of the columns and another near the top. The true distance between columns is established at the base by placing the 2x6-in. nailing bucks already mentioned; nailing

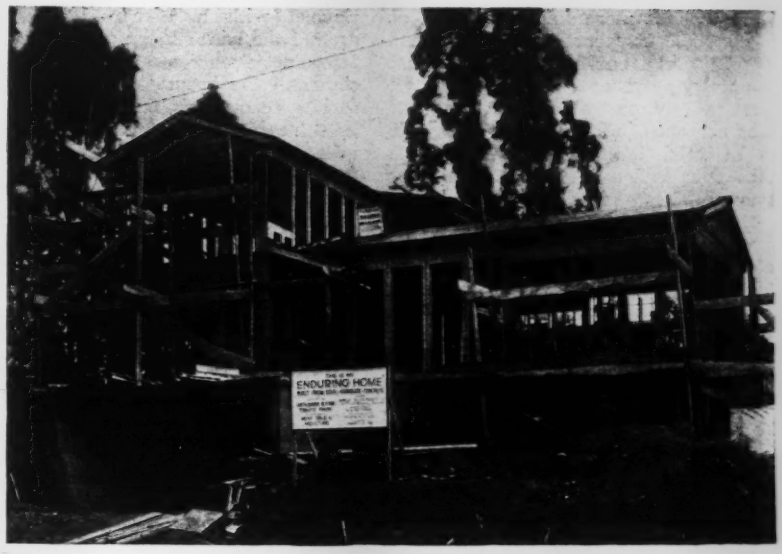


Fig. 1—FRAMEWORK of concrete residence after stripping forms

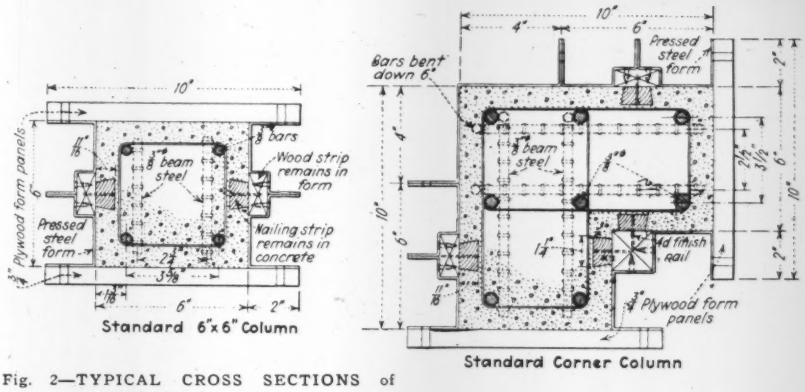


Fig. 2—TYPICAL CROSS SECTIONS of standard column forms

bucks of exactly equal length are used to space the columns at the top. The 2x6 studs then are nailed in between the top and bottom nailing bucks. The standard length of the steel column forms provides for an 8-ft. ceiling. If higher ceilings are required the column forms are extended by the use of plywood and ordinary 2x6s.

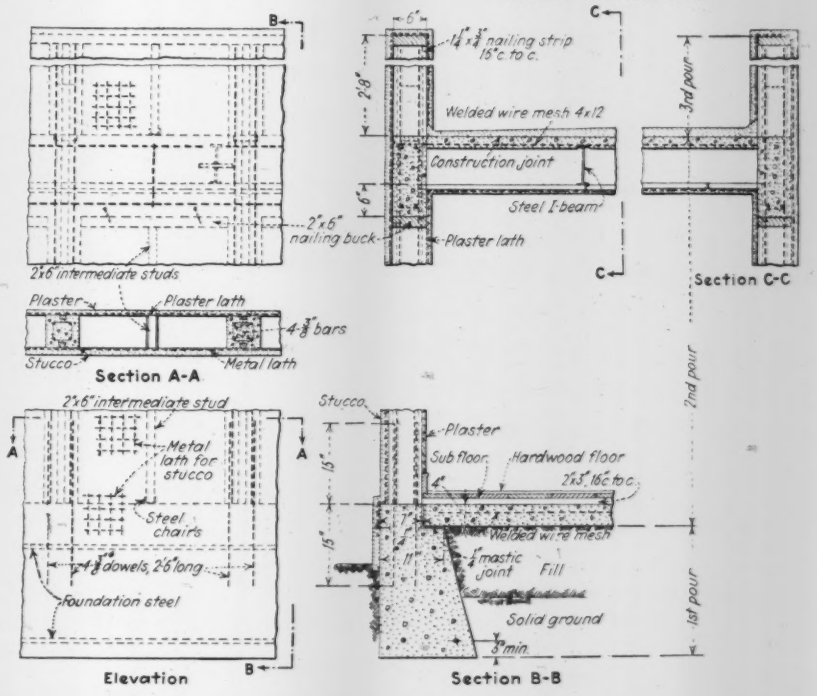
As a final step before the second or wall pour, 4x4-in. vertical studs are fastened to the horizontal wales at approximately 64-in. centers in a position to support the framework which holds the spandrel beam forms. I-beams are placed in position resting on the inside edge of the spandrel beam forms and are shored up from the floor below with 2x4s. When all of the floor forms and reinforcing steel have been placed the first story of the house is ready to pour. Spandrel beam forms usually are made of plywood and may be used for about ten pours. The steel column forms, with proper treatment, last indefinitely.

Light-weight aggregate

Thus far structures of this type, instead of the usual crushed rock or gravel aggregate, have made use of a manufactured light-weight aggregate which is an expanded, burned clay. A distinguishing feature is the rounded contour and light weight of the individual particles; this applies to all sizes from the smallest "sand" to coarse aggregate. This product is mixed with portland cement and water exactly as would be done with natural aggregate.

Because of its vesiculated character the light-weight aggregate makes concrete whose weight is 30 to 40 per cent less than concrete made from natural

Fig. 3—ELEVATION and sections of the structural concrete frame



aggregate. A more important element in residence construction is that it has approximately one-fourth the thermal conductivity of standard concrete; a great advantage where concrete roof slabs are used. Roofs usually are made up of 2-in. light aggregate concrete slabs over which is placed a finishing layer of the same material with an average thickness of 2 in. The top layer is given the necessary slope of ¼ in. to the foot to insure drainage. The total 4-in. thickness of the light-weight roof slab has an insulating value equal to 16 in. of ordinary concrete.

The 2-in. reinforced concrete floor slab rests on steel I-beams and is continuous with a 16- to 18-in. beam around the entire house between floors. If ordinary concrete were used the floor slab and the beam together would afford a ready path for the transfer of heat into and out of the house. However, by use of the light-weight aggregate the passage of heat along this path is greatly retarded.

Compaction of concrete in the forms is accomplished with the aid of vibrators. With the light-weight aggregate it has been found safe to use an amount of vibration that would be excessive in ordinary concrete; the danger of segregation of fine and coarse material in the light-weight aggregate is remote.

Only about 20 per cent of the exterior wall area of the residence [illegible] with construction of this type has to be formed. Forms for the second story floor and floor slabs may be 1x8 in. boards supported in conventional manner between the I-beams or may be in the form of a ribbed, expanded metal lath which is left in as part of the floor slab.

The standardized forms which have been designed for this type of construction are made by the same firm which manufactures the light-weight aggregate, Gravelite, Inc., Point Richmond, Calif., and are the invention of Robert D. Pike and J. H. Colton.

Looking Forward To Municipal Housing

Special state legislation will be a prerequisite to participation in federal subsidy when and if it becomes available

By Edward H. Foley, Jr.
Director, Legal Division, Public Works Administration, Washington, D. C

IT IS GENERALLY ASSUMED *that a public housing bill will be enacted by the next Congress. The bill would provide a federal subsidy but otherwise would transfer responsibility from the federal PWA to the states and cities. It would also require that certain local legislation be passed. The nature of this legislation was outlined by Edward H. Foley, Jr., director of the PWA legal division, in an address to the convention of the National Association of Housing Officials in Philadelphia on Dec. 4. Mr. Foley's suggestions to states and cities who wish to participate in public housing are presumably as near official as any that can be made at this time, and are therefore presented here in some detail.* —EDITOR.

WE ARE about to witness a significant change in housing emphasis in this country. The necessity for stimulating employment through the construction of useful public works plus the inability of private enterprise to provide decent housing for our lower-income groups forced the federal government to enter the field of direct construction of public housing. Now the Public Works Administration is about to decentralize public housing and turn over to states and local housing authorities the responsibility of initiating, constructing and operating low-rent housing projects with PWA financial and technical assistance.

Public housing as it now exists goes back to the summer of 1933 when PWA commenced its housing program by making loans to limited-dividend housing companies, a type of financing which had been initiated by the RFC. Seven projects were financed in this way, and although these projects were successful from the standpoint of increasing employment it was soon apparent that housing facilities undertaken by limited-dividend companies could not be brought within the reach of persons in the lowest income brackets. Several factors were responsible for this: the lack of power to condemn real property; the ineligibility of private companies to receive direct governmental subsidies; the efforts of promoters to dispose of land at unreasonably high prices; and the provision for profit, even though limited.

Direct federal construction begun

PWA then turned to the only method open to it, namely direct federal construction, under which plan fifty projects were undertaken. These projects probably would never have been started by PWA if they could have been financed and constructed legally by non-federal public bodies on a loan and grant basis. Certainly, this direct federal construction did not represent the abandonment of the principle that the responsibility for initiating, planning, constructing, financing and operating low-rent housing projects should rest with the local and not with the federal government. Nor was it a case of government competing with business. It was the government undertaking an activity which private business cannot undertake, and which local governmental units frankly were unable to carry on.

State legislation

In December, 1934, President Roosevelt wrote to the governor of every state suggesting the enactment of legislation which would provide an effective method of undertaking locally a low-rent housing program. In these letters the President said that if the governors would write him how they felt about this suggestion, he would request Administrator Ickes to have prepared such bills as might be deemed advisable. In response to requests from the governors, PWA submitted drafts of a housing authorities law and of a housing cooperation law. Largely as a result of these efforts, 20 states have now enacted housing legislation providing for the creation of housing authorities having broad power to undertake and operate housing projects but no taxing power. The authorities are

given the right to acquire property by eminent domain—an essential power if land necessary for a low-rent housing project is to be purchased at reasonable prices.

Wherever constitutionally possible, PWA suggested that the property of such authorities be made tax exempt. In order that adequate housing facilities may be brought within the financial reach of families of low income, government subsidies are necessary. Slums and bad housing conditions constitute a menace to the community in which they exist and necessitate disproportionate municipal expenditures for fire and street protection, crime prevention and punishment, public health, safety and other community services. In view of the benefits and savings which will accrue to the local communities from the construction of low-rent housing projects, municipalities should recognize the economic and social desirability of exempting such projects from municipal taxation.

FIG. 1—PUBLIC HOUSING takes shape in Indianapolis for low-income Negro population. Lockefield Gardens providing 748 living units will be completed this winter

Municipal responsibilities

In order that a housing authority may function effectively in a municipality, there must be close cooperation between the two, which requires the enactment of enabling legislation. For instance, it is necessary for the municipality to furnish the authority with sufficient money to defray, at least, its first year's administrative and overhead expenses. Moreover, the municipality should be empowered to grant various forms of aid and assistance to a housing authority in addition to tax exemptions, for only through subsidies is it possible for the authority to fix rents within the reach of families in the lowest-income brackets.

There will naturally be considerable controversy about what these rents will be. This can be decided by any community according to its own judgment and desires. If any city wants lower rents it can achieve that desirable end by increasing its contribution of local funds to the extent required to obtain these rents.

In cooperating and aiding in the construction and operation of housing projects, municipalities may find it necessary or expedient to sell, lease or donate property to the authority; to furnish parks, playgrounds, and other facilities and to re-zone or re-plan affected areas. It will frequently be necessary in connection with the financing of housing projects for long-term agreements to be entered into between the housing authority and the municipality regarding the furnishing of services and payments in lieu of taxes. To make possible these types of cooperation and assistance by municipalities, PWA has suggested the enactment of the housing cooperation law.

The enactment by the states of housing authority and housing co-operation laws also offers the answer to the problem of what should be done with the fifty existing PWA projects. PWA can and will operate these fifty projects for as long as may be necessary but it is my belief that under appropriate federal and state legislation these projects should be leased or sold to local housing authorities as soon as possible. It is also my belief that in the future, all low-rent housing projects should in general be undertaken by local housing authorities on a loan and grant basis.

Tenancy requirements

While considering the subject of the federally constructed projects, it is important to bear in mind the provisions of the recently enacted George-Healey Act. This law, in addition to ceding back to the states civil and criminal jurisdiction over these projects and authorizing the payment by the federal government of sums in lieu of taxes, contains important provisions with respect to rentals and the selection of tenants who may occupy such projects. The rentals must be at least sufficient to pay all necessary and proper administrative expenses of the project and to repay within not more than sixty years at least 55 per cent of the initial cost of the project together with interest. As to the selection of tenants, the Act limits tenancy to families of low income and provides that no family shall be accepted as a tenant in any such project whose aggregate income exceeds five times the rental of the quarters to be furnished the family. Before the federal government turns over its housing projects to local authorities, it must be satisfied that the local authority will rent the dwellings only to families of low income. To accomplish this purpose, PWA is suggesting that housing authorities laws contain provisions with respect to tenancy similar to those contained in the George-Healey Act.

Another aspect of the problem is the conformance of the projects to local building codes. Federal housing projects may not always comply technically with every provision of local building regulations. In order to avoid any question regarding the power of the local housing authority to take over and operate such federally constructed projects without making structural changes, PWA is suggesting that there be included in the housing cooperation laws appropriate provisions to insure that a housing authority may take over and operate the project exactly as it was constructed by the federal government.

Less than half of the states now have housing authority legislation and even fewer states have legislation for cooperation between housing authorities and municipalities. The opportunity is again at hand to advocate the enactment of necessary state housing legislation. PWA will draft such legislation and have it submitted to the governors. But it can do no more. The rest is up to the local communities and

FIG. 2—SLUM CLEARANCE operations in Cincinnati on the 24-acre site of PWA's $6,500,000 Laurel Homes project foreshadow the transformation of this portion of the old "Basin" section of the city. The foundations are complete and contract for the new buildings was awarded early this month

other groups interested in promoting public housing.

The following program of action is submitted for states which desire to participate in the low-rent housing movement:

1. In those states where housing authority and housing cooperation legislation has not been enacted, such laws should be passed this winter; where changes are necessary in existing legislation the necessary amendments should be adopted.

2. In those states where there is a law providing for the creation of local housing authorities, such authorities should be created at once.

3. Qualified personnel should be designated to manage the authority. It is unusually important that the personnel of the authorities be trained, competent and thoroughly conversant with the philosophy and principles underlying the low-rent housing movement.

4. Housing authorities, when created, should immediately undertake surveys of housing conditions in their communities to ascertain the nature and extent of the need for low-rent housing projects, and funds should be provided for this work.

5. Where it is necessary to test in the courts the validity of the housing authorities law or proposed action under such a law or under a housing cooperation law, test suits should be brought at the earliest possible moment. The quick settlement of doubtful legal questions will aid the marketability of bonds of housing authorities and will avoid legal grounds of attack by self-seeking hostile interests. In many states, no court tests will be necessary. Because of the many recent decisions upholding revenue financing by public corporations, it seems inevitable that bonds of a housing authority payable solely from its revenues and not secured by a foreclosable mortgage on any of its property would be valid and binding obligations of the authority and hence legally acceptable to the Public Works Administration without a test suit.

How, it may be asked, will the federal government fit into this program? In addressing the conference of mayors at its meeting in Washington, in November, and without purporting to speak for the federal government, Secretary Ickes said:

"From extensive experience in this field during the last three years, I feel that, in the first place, it should be a local program for which the municipalities shall be responsible, with the federal government giving aid and counsel. *** The federal government, having pointed the way, will not carry forward the program by itself. But it should be willing to make loans and grants to cities in aid of low-cost housing."

In short, future housing projects will be undertaken by local agencies, and the federal government will extend financial assistance to such agencies by way of loans and grants. Action along the lines suggested should be taken at once to bring about an effective basis for federal and local cooperation in the low rent housing field. Since the legislatures of practically every state will meet in regular session next month, the opportunity is at hand to enact legislation relating to housing authorities and to cooperation between the authorities and the municipalities in those states which have not already done so.

FIG. 3—OMAHA WILL BENEFIT from the Logan Fontenelle Homes project which is within walking distance of the business district. The site is cleared (upper left), foundations are complete and the superstructure contract was awarded this month

THE TENNESSEE VALLEY EXPERIMENT—V

River Development on Trial

With a large amount of construction accomplished the TVA to date has not demonstrated that returns will justify its expenditures. And its experience throws little light on how river development is best carried on.

EARLIER ARTICLES *of this series appeared in* ENR *Dec. 3, 10, 17 and 24, 1936, pp. 771, 823, 860 and 929. The present article concludes the series.* —EDITOR

NO SKETCH of an engineering project so far-flung and complicated as the Tennessee Valley Authority's attempt to develop a great river could be complete without reference to the political, economic and organizational factors that influence the undertaking. Some of these have been mentioned in the four preceding articles of this series, because of their effect on the design, construction and operation of the river works. Others are discussed briefly in the present concluding article.

Discordant purposes

The TVA project is concededly an experiment. It is an exploratory investment of hundreds of millions of public money—in what?

A search for the answer to this question leads to disconcerting results. It shows that the various purposes back of the authorizing legislation are so discordant as to stamp the whole enterprise with the mark of uncertain aim. In physical form the TVA work is directed toward accomplishing complete development of a great river for all uses in the interests of an entire region. In respect to purpose, other objectives enter.

In February 1933 President-elect Roosevelt made as his first important statement of public policy an announcement of general plans for a great regional rehabilitation and development project in the Tennessee River basin. Though navigation, flood control and power generation were given prominence, the broad social and economic problems to be met in the Valley were the apparent keynote of the plan. Later, in his message to Congress soon after his inauguration, the President again stressed the need for rebuilding and developing the 42,000 square miles of the Valley, but navigation, flood control and power were more prominent in this message than in the previous announcement.

When it came to passing an act through Congress that would provide the authority and make available the funds needed to carry out the ideas promulgated by the President, the usual logrolling occurred. Farm groups wanted the Muscle Shoals fertilizer plant operated by the government so that they could get fertilizer at low cost. Advocates of public power, led by Senator George B. Norris, saw in the operation of Wilson dam and additional plants an opportunity to realize their dreams of a great rate-controlling public power system. The depressed boom area centering around Muscle Shoals saw its chance to revive a wild real estate speculation. Many who were primarily social-minded inclined looked on the TVA as a means for demonstrating their claims concerning a new order of affairs.

In the Valley itself there was great enthusiasm. The local people were confident that the government millions which would be poured into the project would be of vast benefit to their pocketbooks. Newspapers, civic clubs and all sorts of local organizations hailed the undertaking as certain in a few years to make the Valley the leading agricultural and industrial area of the country. But none of these local or state groups proposed any financial assistance; they expected the government to do the whole job. This attitude has changed little in the three and a half years since that time.

Divided administration

In administration of the act there arose conflicts of opinion and interests that have never been reconciled. The three members of the board of directors of the Authority soon divided the responsibility of administering the act into three parts and parceled these out among themselves, and ever since then the board has functioned virtually as three separate authorities. Each of the three general managers works more or less independently of the other two in respect to determination and execution of policies in his particular field of operations.

This situation has been recognized by all independent investigators who have studied the TVA affairs. In May of this year Marshall Dimock, reporting to the committee on regionalism of the National Resources Board, had this to say:

". . . the three directors of the TVA have divided their supervisory work into three parts; each has the primary responsibility for carrying out the functions falling within his allocation. Although the agreement through which this allocation was effected states that 'this does not mean that the individual directors will formulate policies for their separate divisions. The board as a whole will continue to adopt all policies,' nevertheless such an administrative arrangement is of doubtful wisdom. It is almost inevitable that each director should come to look upon his sphere of control as his particular bailiwick, and consequently integration of policies and programs becomes increasingly difficult.

"If the board were to consist of five rather than three members, the temptation to divide the detailed duties would be lessened, and the way would be opened to more effective concentration upon planning and policy formation on the part of the board acting as a unit. This is simply a recognition of the principles of sound corporate administration, under which the board of directors should be the policy-formulating unit, and, although exercising complete surveillance and ultimate control over the management, should not interfere with administrative details.

"Under such an arrangement, the crying need is for a general manager of the organization's activity. Such an officer is nowhere to be found in the TVA, since the directors have been reluctant to relinquish the administrative power which they have assumed. However, the integration and coordination of activity which would result from the creation of the office, let us say, of president of the board and general manager would be very beneficial.

"Regional development authorities, like other going concerns, need unity of management. Above everything else at this juncture the TVA demands synthesis of policy and planning activities and integration of administrative functioning. The common corporate practice of making the president of the board also the general manager may quite conceivably be the best policy for regional authorities to follow. If there were integration at the top there would soon be coordination all along the line—in planning, in research, and in industrial promotion."

Since then the schism between the members of the board has been frequently aired in the daily press and

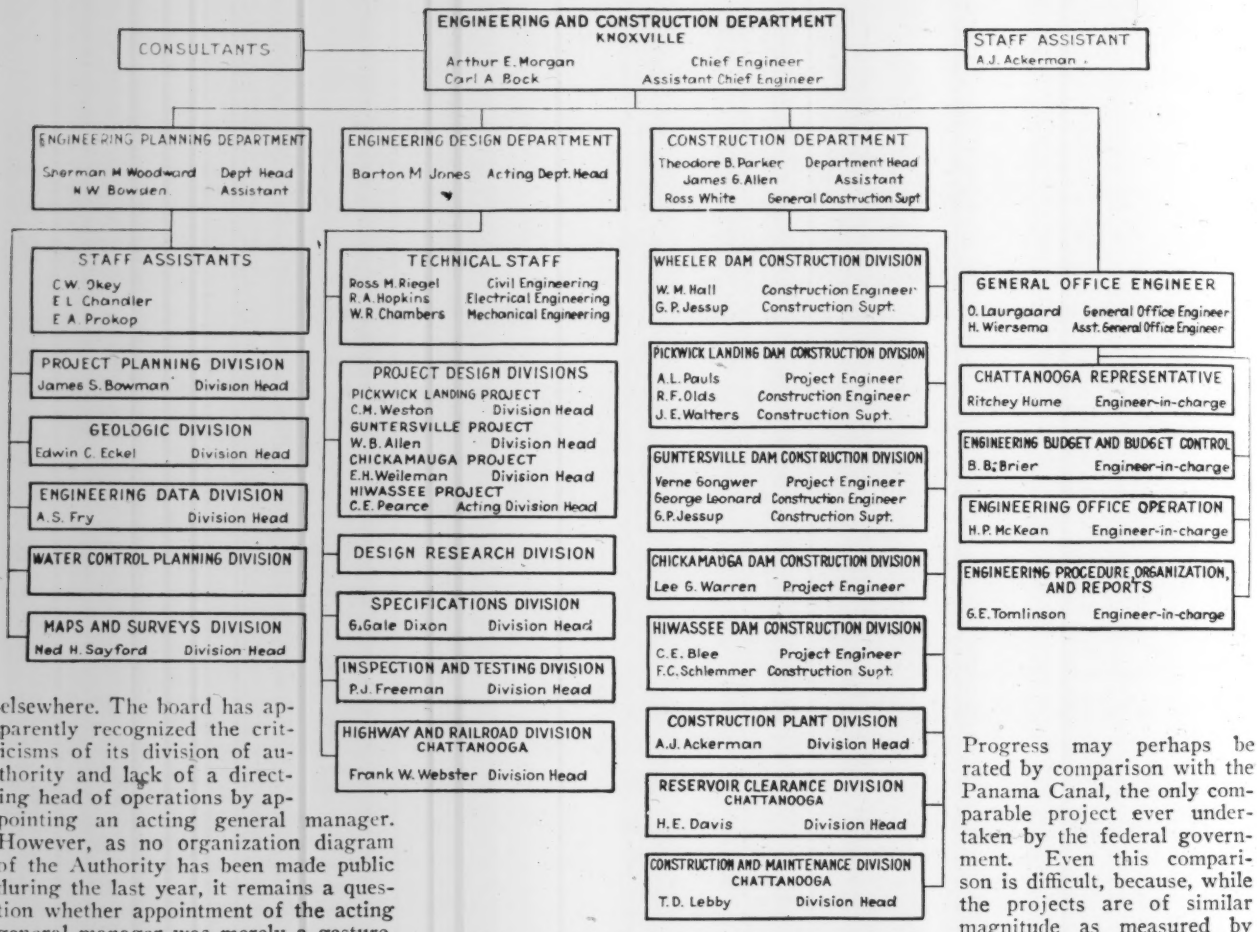


FIG. 1—THE ENGINEERING DEPARTMENT of the TVA is decentralized to the extent that the major dams now have a project engineer in general charge on the ground. When Norris and Wheeler dams were active construction operations the resident engineer and construction superintendent reported directly to Knoxville.

elsewhere. The board has apparently recognized the criticisms of its division of authority and lack of a directing head of operations by appointing an acting general manager. However, as no organization diagram of the Authority has been made public during the last year, it remains a question whether appointment of the acting general manager was merely a gesture. It appears to have been such, since current indications are that each of the three board members remains more or less supreme in the formulation of policies in the sphere assigned to him.

Effect on stream control

Until enough of the Tennessee River is regulated by dams and other works to make effective provision for navigation, flood control and power generation, the dominant importance of a definite basic policy formulated by the board as a whole is not so apparent. But sooner or later the question will come up whether the dams and reservoirs are to be operated primarily for flood control and navigation or primarily for the generation of the maximum possible amount of electric energy. The two uses naturally do not harmonize. If power generation becomes the dominant feature of the operating policies of the Authority, then the basic idea of flood control and navigation is weakened to an extent dependent on the desire to make a showing with the income obtainable from power.

Until some definition is given to this phase of the Authority's activities it will be premature to estimate how effective the works now being built will be for flood control. It is not impossible that a serious flood danger might be created by wrong operating policies. Navigation may be injured in a like way, but to lesser extent, since navigation and maximum power requirements synchronize more closely. The President will doubtless determine which policy the Administration desires to have followed when he decides how to solve the differences between the members of the Authority board and what shall be the TVA's future general course.

Physical accomplishment

An estimate of how far the TVA has progressed in carrying out its assigned tasks is not easy. For one thing, the TVA itself has not yet formulated a complete general plan of what it is going to do. For another, the project extends over so great an area and includes so many detail problems that its proportions cannot easily be grasped. Progress may perhaps be rated by comparison with the Panama Canal, the only comparable project ever undertaken by the federal government. Even this comparison is difficult, because, while the projects are of similar magnitude as measured by cost, in every other respect they differ radically.

About ten years were needed to build the Canal; the TVA has been at work only 3½ years. Given another 3½ years, it should be able to repeat its performance of completing two dams, building more than half of a third, and making a good start on the fourth and fifth. In three-fourths the time required for Panama the TVA thus can bring its river work to a degree of completion where it will give major service to navigation, flood control and power. The TVA does not compare unfavorably with Panama—though of course it has no Culebra Cut to limit its rate of progress nor are there climatic difficulties.

In respect to the value of the work, it should be remembered that when work on the canal had been in progress for 3½ years there was a wide difference of opinion concerning its probable justification; even at a much later period there was disagreement on nearly every question involved in the issue. Later, when the canal got into operation, its success was established almost at once. Coming to the TVA case, there is equally decided difference of opinion after the first 3½ years as to its ultimate success. What the TVA has done so far does not prove

that unified control and development of a great stream is practicable or worth while. But is this fact any more significant than in the case of the canal?

It does not follow, of course, that the TVA enterprise will be such a success as the Panama Canal. On the other hand, it is far too early to conclude that unified river control is unjustified. Nor can we conclude that it is justified; whether the huge investment will ever be able to liquidate its cost on the usual commercial balance-sheet basis is still a wide-open question. Nothing is known of the ultimate outcome of the navigation development, and the results of the flood-control and power work so far are slight. As for the off-river work, about all that can be said is that it is encouraging. There is no basis for evaluating its ultimate accomplishment.

The TVA project as a whole is essentially a navigation and water-conservation undertaking with considerable present and greater future flood-control value and with an important power auxiliary. Power is being generated and sold on a fairly large scale, but there are many private utility systems with much larger operations. Further, until the United States Supreme Court decides a number of suits now in the lower courts, the future of TVA power operations will remain undetermined, even though the government might desire to make them the controlling operating feature.

Regional development handicapped

The President's public statements have repeatedly stressed the broader social and humanistic features of the project. But there is little in the act and its subsequent amendments to authorize activities that would tend to improve the admittedly bad social conditions in the Valley. Neither does the act any more than generalize on how TVA shall proceed to improve economic conditions in the Valley, other than by manufacturing fertilizer and demonstrating the effectiveness of its use. In view of these limitations, it is doubtful how much can be done for the large areas of land too steep to farm but today in large part farmed, the infertile plateau region, or the tenant-farmed bottomlands along the river.

The TVA has done much excellent demonstration work in reforestation, recreational planning, land zoning, conservation of resources, and erosion-prevention. Through this work, also, it has aroused a good deal of interest in the desirability of applying these demonstrations on a large scale. But actual work—except for the farm and cover-crop program—has been confined to lands owned by the Authority. For the rest the TVA could only study conditions and work out methods.

Reasons for this are apparent. The TVA as a federal agency lacks power to do anything (on lands other than those it owns by purchase) except through the initiative of the local governments or the cooperation of individuals, groups and civic bodies. For example, reforestation must be done by individuals or by state or county authorities. Park and other reserves in which conservational or other development work might be done must likewise be established by the local units. Control of land use to prevent silting and soil destruction is a state matter—based ultimately on favorable public sentiment, of course. In short, the off-river objectives of the TVA depend on the cooperation of state and local authorities and the people themselves. There has been no such cooperation, and few signs appear that it will be obtained in future.

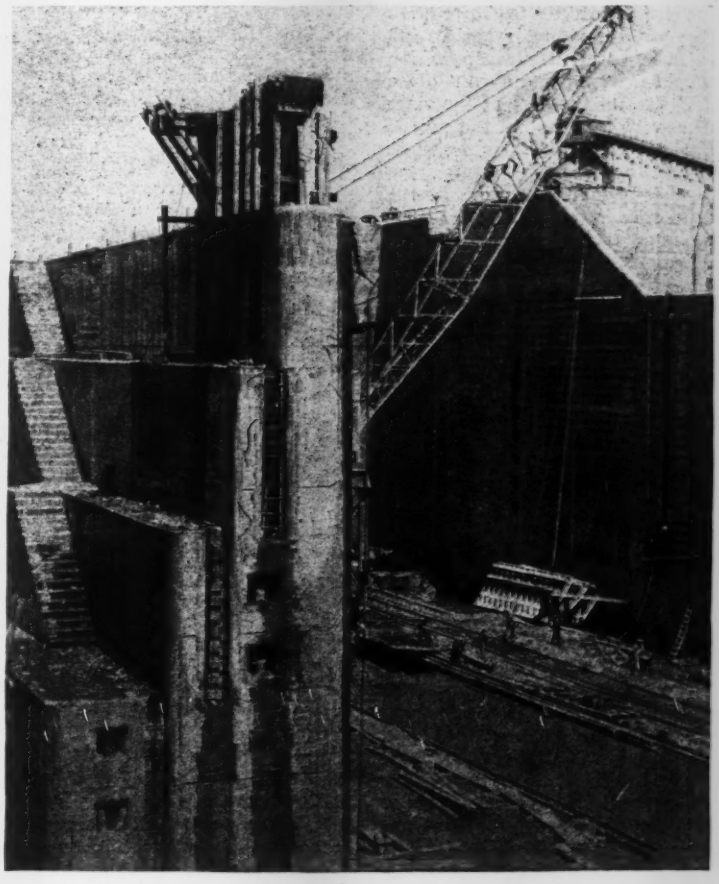
Still less is there any sign that financial cooperation will be obtained from city, county and state authorities in working out the problems in which they are directly concerned. For the construction of waterway terminals and a few other projects that promise direct income, local money may perhaps be forthcoming. But for the basic regional undertakings such as reforestation, development of regional recreational facilities and readjustment of bad social and economic conditions, there is little prospect of obtaining local money support.

The TVA thus remains a detached federal organization, capable of attaining results only by inspiring and enthusing local authorities—and this it has had very little success in achieving. After nearly four years the TVA is quite as alien to the region as are all the other federal bureaus that operate in the Valley. So far as the success of Tennessee Valley development depends on joint enterprise, in which the TVA is mainly a planning and coordinating agency, the experiment is a failure to date except in the fertilizer demonstration and cover-crop work and in some small beginnings of regional planning.

Considering the huge sum already spent by the TVA—$100,000,000 to the middle of 1936—and the as yet unestimated sum required to complete the project, the question of returns on the cost compels attention. Returns up to now are small—for all practical purposes negligible. The outlook for future returns is uncertain. Flood benefits and navigation benefits are indirect returns; power is the only money return in sight.

As to navigation benefits: Little river

FIG. 2—THE LOCK at Pickwick Dam was the first piece of construction undertaken at that point. The total lift in the lock chamber will be about 60 ft.



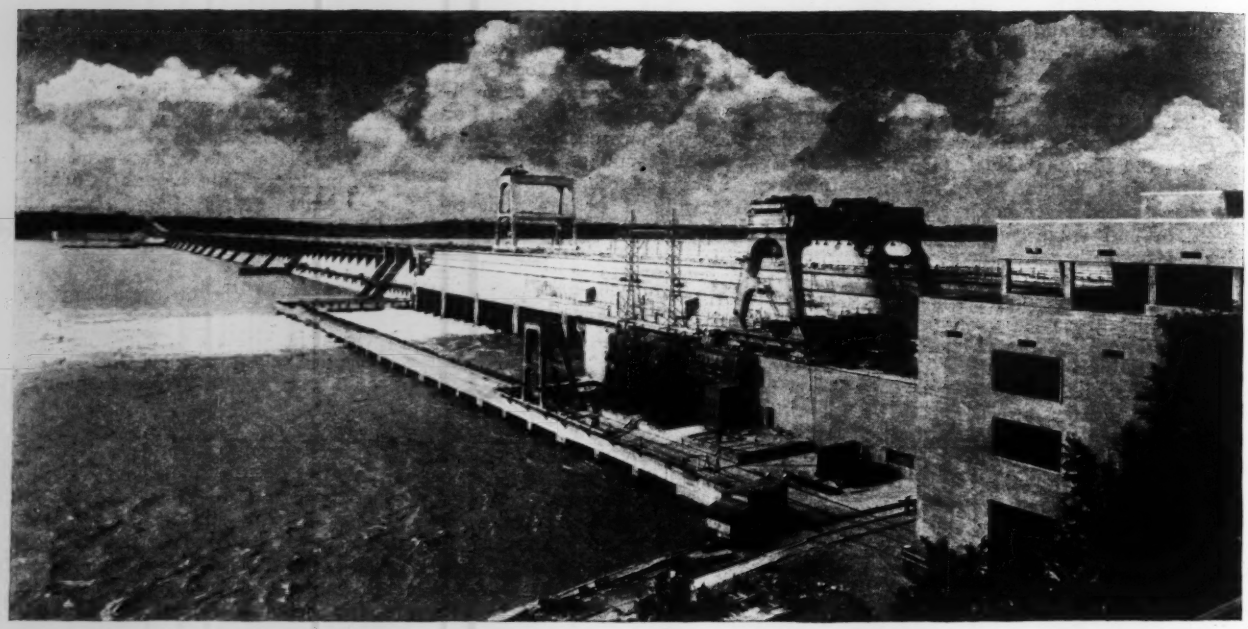


FIG. 3—WHEELER DAM, though primarily a navigation facility, is to have two power units of 32,000 kw. capacity installed in the open type power station shown in the foreground. Ultimately there will be 265,000 kw.

traffic is possible until the 9-ft. channel is completed to Chattanooga at least, and that is some years distant. Even when it is realized, a decided industrial expansion in the Valley must come about before the volume of traffic can approach that on the Ohio. The hoped-for traffic of 10 to 15 million tons per year ultimately, rated at full savings over present transportation rates, would carry the interest on a substantial item of the cost of the river work, but very far from the whole cost. Part of this revenue is fictitious, moreover, being merely taken from revenues that would otherwise accrue to rail and road transportation.

Future improvement of the navigation balance sheet by growth of traffic on the tributaries from new industrial development is even more speculative than the main-river traffic outlook. In any event, none of the navigation savings will be returned to the national treasury even in part, and the benefit arising from reduction of transportation cost by the river canalization is in the main local. Thus, in respect to navigation three conclusions appear: (1) the future economic justification of the project is quite uncertain, (2) the entire risk is assumed by the federal government, and (3) even though the project proves unsound because of developing too little traffic, it may be profitable to the Valley because whatever savings in transportation cost it produces go into local pockets.

Flood benefits next claim attention. The 3-ft. reduction in height of last spring's flood at Chattanooga accomplished by Norris Reservoir storage showed that the TVA's work is already producing tangible benefits. But no forecast of ultimate flood benefits is possible in the present uncertain condition of TVA operating policies. If the river works are controlled primarily for power, as some would like, the flood protection realized will be of rather dubious value. This applies to the reduction of flood crests and hence damages both along the Tennessee itself and along the lower Mississippi.

Those within the TVA organization who have studied the flood question are convinced that large savings will accrue—given proper operation of the works. Flood damages average $1,000,000 per year on the Tennessee. Were the river works capable of preventing all of this damage they could be credited with the capitalized value of this sum, or say $30,000,000. However, river control will save only part of the damage from the greatest floods, and local works must be built to complete the protection. This means that only part of the thirty millions can be credited against the cost of the reservoirs.

When we ask what income will be realized from the sale of electric energy generated at the several dams TVA has built and contemplates, the answer will remain unknown for some years. There is no doubt about production of a large amount of potential power, and full calculations have been made of how much may be sold as firm and how much will be merely secondary power. But experience may be required to show conclusively what amount of prime output will be realized in actual practice and therefore is safe to sell under contract. Further, TVA's power income also depends on whether a southeastern private and public power pool can be successfully formed. Court decisions may also affect the income from power.

During the last fiscal year TVA took in $1,170,000 from power sales. Of this, however, TVA's own construction work and fertilizer plant bought $343,000 worth. Another $588,801 came from sales to private utilities, who may not always be customers. Since July 1, 1936, sales have run well ahead of the previous year; low water during part of this time may have affected sales favorably. But it is clear that even on most favorable interpretation of the figures, much time will pass before power sales can pay interest on any considerable part of the huge investment in dams and generating stations.

If the above figures are set over against the cost of TVA operations it is easily seen that for a good many years the enterprise will not be on a paying basis, even when all tangible benefits are counted regardless of whether or not they reach the federal treasury. As for a balance sheet of ultimate economic results, data for it do not appear to exist. Further, the outcome depends on how much the business and industry of the region is stimulated as a result of the TVA's work, an effect that, as previously suggested, has remained negligible up to now.

However, beyond the direct benefits expressed in revenue collected or transportation and flood costs saved, account must be taken of those less tangible gains that will accrue from soil protection, forestation, and TVA's research and educational efforts, such as bringing about better farming and more use of fertilizer, working out china-clay production and firing, and promoting recreational development.

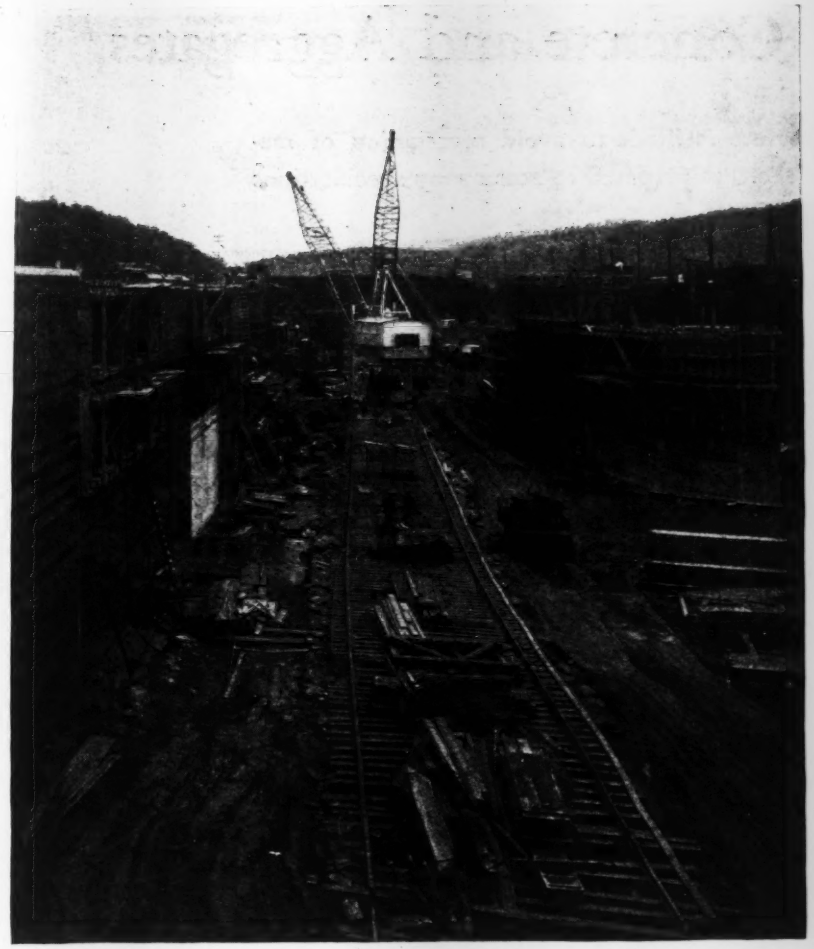


FIG. 14—AT GUNTERSVILLE DAM work on the navigation lock is going forward rapidly. This picture was taken late in October.

These cannot be valued in figures at present. The industrial research should be capable of appraisal after some years; erosion prevention and forestation will attain no value until the local agencies take them up actively.

How will costs be allocated?

A much-discussed phase of the accounting of multipurpose river works is the allocation of costs between navigation, flood protection and power. How TVA will eventually allocate the cost of its dams, reservoirs and control works other than those devoted exclusively to power production remains to be determined.

Allocation has been just as live and acrimonious an issue in the Tennessee Valley as at Bonneville and elsewhere. A tentative distribution of the cost of Wilson Dam to navigation, flood control and power generation has brought spirited criticism. Determination of policy on allocation of costs, however, will affect power prices decisively, and probably no final allocation will be made until after the Administration decides whether the TVA project is essentially for the generation of power or whether power really is incidental to development of the river for navigation and flood control.

On the basis of ordinary bookkeeping it seems therefore that the economic justification of the TVA undertaking is undeterminable at this time. Proponents of public power generation and sales, economists impressed with the necessity of reclaiming and developing such despoiled areas as a large part of the present-day Tennessee Valley, and those who believe that waterway navigation is essential to the future welfare of the country, feel that ordinary bookkeeping is too restricted to apply to the accounting of an undertaking such as this. Some years in the future an unbiased answer may be found. At the moment the TVA remains an agency spending huge amounts of federal government money annually with little prospect of early income large enough to justify the outlay.

Does TVA show the way?

Regardless of its relation to the particular problems of the Tennessee Valley, the TVA experiment—first full-scale attempt at comprehensive river development—is important for what it can teach as to ways of handling the development of other rivers. Three phases of the work are at issue: the technical problems, those of organization, and those of finance.

As to the technical problems of river development, the TVA work has shown that these are capable of solution. The earlier articles of the present series of five outlined the way in which water conservation, flood control, navigation and power were analyzed and showed that the various problems involved have been solved or else are well on the way to solution.

As to staff organization, the experiment also has developed rather fully. A current diagram of the engineering organization (see Fig. 3) shows little change from that developed during the first year; the main modification is adoption of project control in place of centralized control. During construction of Norris and Wheeler dams the construction engineer and construction superintendent each reported directly to the Knoxville central office. Main projects subsequent to Wheeler have each a project engineer in general charge on the ground, coordinating with a project designing engineer in the central designing office and having power to approve or disapprove of the designs.

The broader problem of organizing a stream-basin development undertaking, namely to provide a regionally representative governing and administering body, did not arise in the TVA's case, as the Authority is a directly appointed federal agency. For this reason nothing can be learned from the TVA as to how a river district should be set up to give representation to the various parts of the region and enlist the support of local agencies, nor as to how it acts should be supervised and audited. The only part of TVA experience that supplies a useful model for such a district is that of the engineering organization.

For the same reason nothing can be learned from TVA experience as to how river development can be financed. The TVA has made no use of its authorization to issue bonds. It was not empowered to call on local agencies to contribute to the cost of the work. It received no cooperation from the states in the way of establishment of benefit districts or otherwise. Without the hundred million dollars of money supplied by Congress, it would have been unable to accomplish anything.

The Tennessee Valley experiment, then, is a precedent and model only in its technical activities. The problems of organizing and financing river development and establishing sound policies to guide its administration as a business and public-service undertaking remain to be worked out.

Handling of Concrete and Aggregates

Correct and incorrect methods to avoid segregation of materials shown by sketches prepared to accompany specifications

By Lewis H. Tuthill,

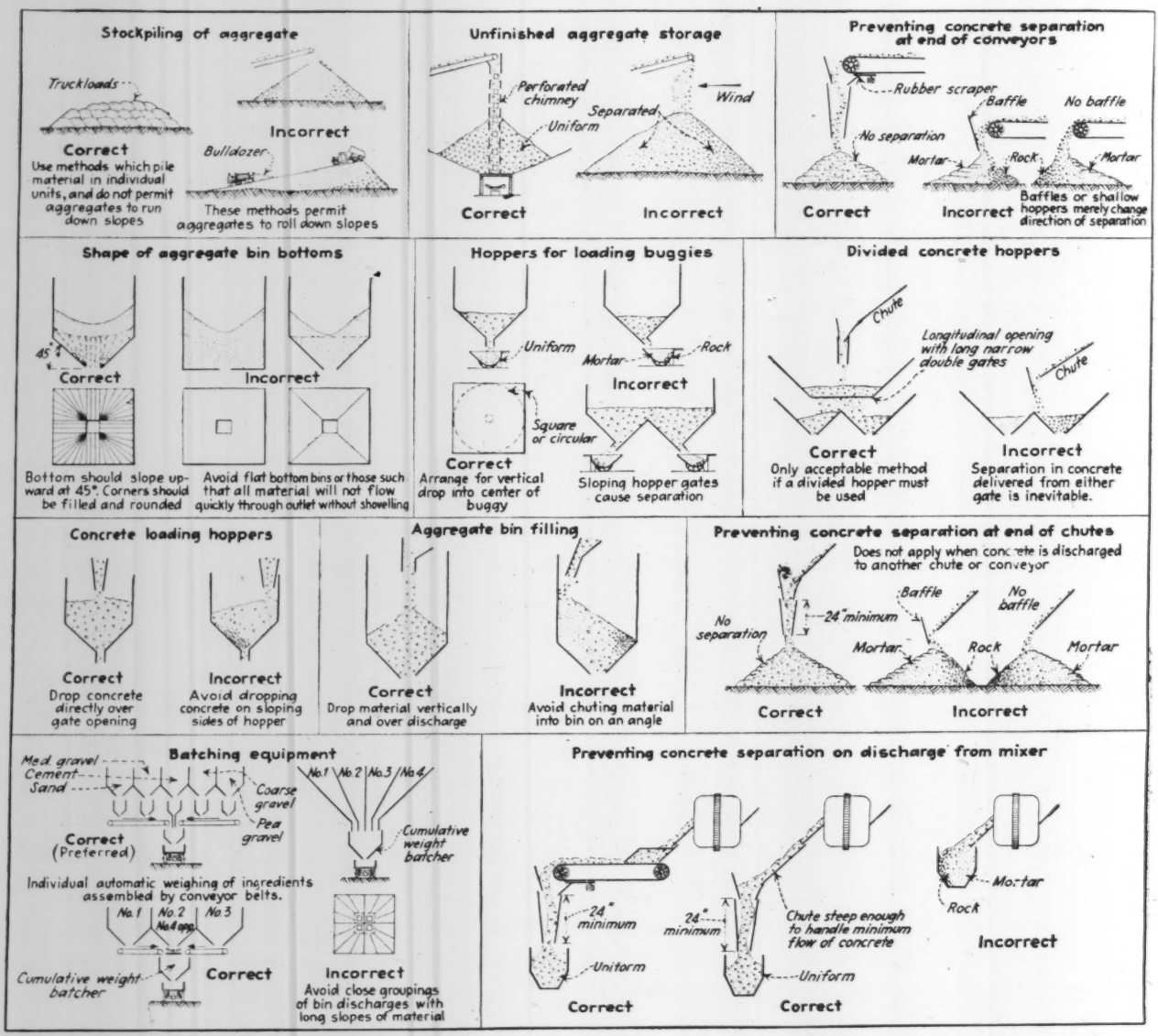
Testing Engineer,

Metropolitan Water District of Southern California

ONE of the principal causes of inferior quality and poor workmanship in concrete work is the separation of coarse and fine materials in the various operations of handling aggregates and freshly-mixed concrete. Consequently, most concrete specifications in some manner require that separation shall be avoided. After repeated attempts to state this requirement more forcefully in specifications text, it was found that certain details invariably appeared in the equipment arrangement which resulted in more or less separation. It seemed that words alone could not be arranged so as to create a specification which would be so unmistakable that arrangements of equipment producing separation would not be set up on the work.

As a result of this experience, the accompanying sketches were assembled on a standard drawing. Each of these sketches shows the correct, and a commonly encountered incorrect, arrangement for some plant or equipment detail. Few dimensions are given, as the sketches are not design drawings but are a schematic presentation of the principles which must be followed in handling concrete aggregates and concrete if separation is to be avoided.

Such a drawing should prove helpful to contractors, engineers and inspectors responsible for approval and performance of aggregate and concrete plant under ordinary specifications. It might be made a part of the specifications.



CURRENT NOTES ON SEWAGE DISPOSAL

An analytical summary of recent developments conducted by

WILLEM RUDOLFS
Chief, N. J. Sewage Experiment Station
New Brunswick, N. J.

● STORM OVERFLOW SCREENS

Preventing relatively coarse material from entering streams during storm flows has been practiced in a number of instances and in some places fine screens are installed to prevent the passage of suspended solids. Electrically-operated fine screens with brushes to remove adhered materials are practical but there are occasions when wood, iron, brick, etc., entering with the surface wash, lodge on the screen and the brushes are unable to remove the obstruction. Muller (*Die Stadtreinigung*, 28, June 7, 1936) describes a vertical drum screen placed in a storm overflow which requires no extra head for operation because the flow does not pass under a baffle as was necessary with systems previously used.

The screen with a diameter of 6 ft. rotates at about 7.5 ft. per sec., while the sewage has a velocity of about 6 ft. per sec.; the screen, therefore, moves about 20 per cent faster than the velocity of the sewage. This faster movement keeps the fine 5 mm. wide and 70 mm. long slots of the screen open, thus preventing clogging as well as minimizing the possibility of forcing suspended material past the screen. Experimental work has shown that the relative velocities and screen openings given above are best. The screen is placed in the widened channel after the water passes over a weir about 8 ft. in width. No brushes, water under pressure, or air are necessary to keep the screens clean. Results obtained over several months show that 99 per cent of the particles over 1 mm. in size were removed by the screen.

● GAS LIQUOR PURIFICATION

Gas house liquors discharged as waste products in the gas industries vary in composition with the various processes in which they are produced. They are generally of a noxious and pollutional nature, and likely to cause trouble at municipal disposal works if mixed with sewage without special precaution for regulation and preliminary treatment. Until recently gas liquors were treated at the works by distillation for the recovery of ammonia, but the cheap production of synthetic ammonia from atmospheric nitrogen, has made gas house production unprofitable. Efforts have been made in two directions to solve the gas liquor disposal problem, namely (1) recovery of ammonia and other constituents such as phenols, and (2) getting rid of the liquors by evaporation or by treating them together with domestic sewage. Garner and Wishart (*The Surveyor*, Sept. 11, 1936) have reported some experiments dealing with the proportion of gas liquor which can be handled by trickling filters and how much of the individual constituents could be removed at different rates of concentration. It appeared that the main oxygen absorbing constituents were phenols and that the chief agencies effecting purification were oxidation of the bulk of the phenols and nitrification of part of the ammonia compounds. An optimum efficiency of the filters was obtained when the gas liquor concentrations were between 0.5 to 1.0 per cent. Within this range of concentration the liquor could be treated on filters at a rate of about 350,000 gal. per acre-ft. per day, with a reduction of 60 to 70 per cent of the phenol content, and 40 to 50 per cent of the "oxygen absorbed." Concentrations of more than one per cent gas liquor in sewage were definitely harmful to the purification processes. The authors are of the opinion that evaporation and incineration carried out under proper conditions afford a satisfactory and complete means for disposal within the gas works.

● GREASE FROM SLUDGE

From time to time the question of recovery of by-products from sewage sludge comes to the foreground. Extraction of grease has been practiced at a number of places, but eventually discarded unless excessive quantities were present. Estimates show that for a population of 100,000 people from 180 to 365 tons of crude fats are present in the sludge. After a study to compare the utilization of crude fats by extraction with the production of gases by digestion, Sierp (*Gesundheits Ingenieur*, Aug. 28, 1936) concluded that if an extraction process is employed fresh solids only must be used. Gas production for power and heat is considered simpler, more economical and, from a technical standpoint, better practice. In cases where large quantities of fats are present on account of industrial wastes grease recovery may be of advantage.

IRON SALTS INCREASE FILTRATION RATES

Addition of ferrous sulphate or ferric chloride for odor control has been practiced at several sewage plants in this country, and it has been observed that this use of iron salts in small quantities also aids in the settling of suspended solids. Large scale experiments at London conducted by Coste (*Surveyor*, Jan. 17, 1936) showed that when iron salts for odor control were added to the septic effluent from settling tanks there was not only a greater removal of finely divided material, but, in addition, the ferric-treated septic effluent filtered more rapidly than usually had been the case with untreated effluent. This information should be of value to those who are now using partial chemical treatment and who plan to install trickling filters to obtain results equal to or better than complete chemical treatment. Filtration of septic effluent without precipitation is usually considered difficult.

● SCREEN-SETTLING TANKS

Physical methods of sewage treatment are gradually being improved. Non-clogging fine mesh screens have been experimented with, and in some instances installed for use in lieu of settling tanks. While the installation of bar screens inside of sedimentation units to remove coarse material that might cause trouble with pumps is not new, the use of extremely fine screens is a recent development. Kusch (*Technische Gemeindeblatt* 39, 73-76, 1936) describes the use of two phosphor bronze screens, placed at the third points in a tank and covering the entire cross-section, with openings of 0.7 mm. in the first and 0.26 mm. in the second screen. These wire screens are rapidly covered with a slimy sheet which, by absorption, prevents fine particles from passing through. Operation of a year has shown that an additional 35 per cent of finely divided material can be removed by the screens above that taken out by the settling tank. It is claimed that the screens do not clog, that they are self-cleaning and require no extra head for operation. If the claims are correct such screen-settling tank combinations would produce results comparable to those obtained from sand filters operated at high dosage rates.

Book Reviews and Notes

A Monthly Commentary on Current Additions to the Civil Engineer's Library

Arc Welding Handbook

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE — 4th edition. Prepared by the Lincoln Electric Co. Fabricoid; 5½ x 9 in.; pp. 819; Halftones, linecuts, tables. Published by the Lincoln Electric Co., Cleveland, Ohio. Price $1.50 in U. S.; $2.00 elsewhere.

IN GREATLY ENLARGED FORM, this well known handbook enters its fourth edition since 1933, making it practically an annual publication. Additions include 223 new pages and 290 new illustrations and cover such items as the characteristics of the welding generator, selection of joint types, arc cutting, welding current polarity, effect of electrode size on welding costs, methods of testing weld metals and principles of surfacing by welding. Aimed at a wide class of readers ranging from welding operators to executives, the book necessarily is elementary in its design sections, which nevertheless are instructive because of the many types of welded joints and structures illustrated. The sections on welding technique and on procedures should be particularly useful.

New York Municipal Activities

NEW YORK ADVANCING—A SCIENTIFIC APPROACH TO MUNICIPAL GOVERNMENT. An accounting to the citizens by the departments and boroughs of the City of New York, F. H. LaGuardia, Mayor. Paper; 6x9½ in.; pp. 368; Halftones, linecuts, tables. Published by Municipal Reference Library, New York. Price 50c.

OPENING with the quotation by Mayor F. H. LaGuardia of New York that "To the victor belongs the responsibility of good government," this book gives an accounting of municipal activity during the past two years of his administration. In narrative style it sets forth the problems of administering the affairs of a great city and relates the efforts that have been made to improve the functions of the various departments. Written as a progress report to the citizen stockholders of a vast municipal enterprise, this document seeks to enlist interest and acquaint the public with the intricate ramifications and scope of city government. The books opens with a broad discussion of administrative policies, and in the course of ten succeeding chapters the various organized services are reviewed. These chapters are divided into sections, concerned with specific departmental functions, the material for which was contributed by the respective department heads. Everyone interested in city government, and municipal officials in particular, will find "New York Advancing" worth the reading. A handbook of this type, whose objective is to clarify and make understandable the problems and purposes of a local government, is not common. This one sets an example in attention-compelling and interesting municipal reporting that might well be adopted by other cities.

Soil Conservation

SOIL EROSION AND ITS CONTROL—By Quincy C. Ayres. Cloth; 6x9 in.; pp. 365; halftones, linecuts tables. Published by the McGraw-Hill Book Co., New York. Price $3.50.

RICH LAND POOR LAND—By Stuart Chase. Cloth; 5½x8 in.; pp. 361; halftones, linecuts. Published by Whittlesey House, New York and London. Price $2.50.

AS A CONTRIBUTION to the important public issue of controlling erosion, two current books invite attention: Ayres' "Soil Erosion and Its Control", and Chase's "Rich Land, Poor Land".

Much of what is known about the relatively new subject of agricultural soil erosion is brought together for the first time by Prof. Ayres. Though it is essentially an agricultural text, being evidently intended for the farmer and his advisers, the civil engineer should find a good deal of practical interest in the discussion of terraces, their relation to soil and water, their layout, construction and discharge provisions, and the extended chapters on gully-control dams. Both temporary gully checks and the more permanent structures—called soil-saving dams—will attract his attention as presenting a substantial number of engineering problems well beyond the amateur range.

A book that enters a new field can hardly be expected to meet all possible demands. Yet the engineering reader, remembering the bad failure record of gully-dam construction in the past few years, will be inclined to ask whether the elaborate designs and instructions for building thin reinforced-concrete dams will really enable the farmer to do work that is essentially of engineering character. The earth dams that are discussed also involve serious hazard.

And finally, how are the terrace and dams discussed in the book going to hold back the 270 million tons of dissolved matter that according to the author's opening statements, go to the sea every year as a result of uncontrolled erosion. Granting that the art of erosion control is primitive it does seem unlikely that water will ever be robbed of its dissolving power, or that the total amount of water going to the sea will be reduced. In fact, when (if ever) all water is made to sink into the ground before it reaches the rivers it will probably carry away even more dissolved matter than it does today.

Those who like the grotesque modernistic art that distorts forms and faces for the sake of an impressionistic effect may find Chase's "Rich Land Poor Land" enjoyable reading because of its sensationalistic style in hurrying over a broad field of conservation that includes soil-erosion control. If such readers will take the author's facts with enough grains of salt and interpret his sketches as cartoons, not photographs, the book should not hurt them. Essentially it is reading matter to feed the emotions, not the mind.

Berlin Rapid Transit

DIE BERLINER U-BAHN—By Johannes Bousset. Paper; 8x12 in.; pp. 140; halftones, linecuts, tables. Published by Wilhelm Ernst & Sohn, Berlin. Price 18 RM

Reviewed by Alfred Brahdy

Designing Engineer, Board of Transportation, New York, N. Y.

ORIGINALLY part of an ambitious undertaking which was to comprise a complete history and an analysis of all engineering and operating features of the "U Bahn" of Berlin, Germany, this section describing the design and construction problems, is now presented in book form by the author, a former director of the Berlin elevated and underground railway. The book does not contain data on the recently constructed portions of the "S Bahn" which is under the jurisdiction of the state railroad.

The design and methods of construction for the two-track subways comprising 80 per cent of the system are similar to New York practice, except that station structures are of larger proportions and more elaborate than appear to be required solely for railway purposes, and some of the stations would here be classed as monumental civic structures. The control buildings of stations in residential areas have modernistic outlines similar to the suburban stations of the London "Underground". Elevated railways are limited to the center "promenade" of wide streets and 8 per cent of the roadbed is in the open, either on embankment or in cuts. The description of these structures based on apparently intimate

first hand knowledge is amplified by 215 well selected, excellently executed line drawings, photographs and maps. A number of illustrations show the sequence of construction in good detail. An interesting departure from American practice is contained in the chapter on storage yards, which shows all layup trains housed in huge sheds instead of being stored on open tracks.

The present state of intellectual isolation of the German engineers may be noted from the fact that in making comparisons with other subway systems no mention is made of the 55-mile long Independent Subway System of New York City opened in September 1932.

The publication of this book may serve to call attention to the dearth of published data in English on rapid transit in general and regarding subways in particular. Great achievements and improvements in the planning, construction and operation of underground railways, the collective effort of many able engineers, is in these United States unrecorded except in fragmentary form. Such are the ways of the Sons of Martha.

Miscellaneous Notes On Booklets and Reprints

TESTS AND DESIGN OF STEEL WIND BENTS for tall buildings are discussed in Bulletin No. 93 issued by the Ohio State Engineering Experiment Station based on studies made in cooperation with the American Institute of Steel Construction. The booklet is priced at 75 cents. Address the Director, Engineering Experiment Station, Columbus, Ohio.

THE NATIONAL RESOURCES COMMITTEE has issued the following reports recently: Progress Report, with statement of coordinating committees (25c.); Drainage Policy and Projects; Interim Report to the National Resources Committee by the research committee on urbanism; Regional Planning, Part III, New England (30c). Where prices are given, printed copies may be obtained from the Superintendent of Documents, Washington, D. C.

RAILWAY CAR-FERRIES, American and Foreign, form the subject of a 55-page illustrated paper in Bulletin 387 (July, 1936) of the American Railway Engineering Association. Numerous ocean and river ferries are listed and described, with special attention to Lake Michigan, where several car-ferry lines are operated by a fleet of about 20 steamers, constituting by far the largest car-ferry system in the world. The Seatrain line between New York, Havana and New Orleans, with steamers of novel design, is included, together with the English-French line started on Oct. 14, 1936, between Dover and Dunkerque. This paper covers the histories, the routes and operations. It can be obtained from the association, 59 East Van Buren St., Chicago.

STEEL HOUSE CONSTRUCTION, a description and cost analysis of house No. 4, built under the direction of the Purdue Housing Research Project, is the subject of Vol. 1, Nos. 10 and 11, of the Home Information Service, published twice monthly by Better Homes in America, Lafayette, Ind. The subscription price is $2 per year. Plans of the house described and information as to the use of this type of construction for similar houses may also be obtained by addressing the Insulated Steel Construction Co., Middletown, Ohio.

New Books and Revised Editions

[Those desiring copies of the books listed below or mentioned elsewhere in this section should order them from the publishers or from their local booksellers.]

SEWERAGE AND SEWAGE TREATMENT—By W. A. Hardenbergh. Fabricoid; 5x8 in.; pp. 396; halftones, linecuts, tables. Published by International Textbook Co., Scranton, Pa. Price $3.50.

PROVAS DE CARGA DAS PONTES DE SAO VICENTE E DE JACAREHY—By Telemaco van Langendonck. Bulletin No. 16, August, 1936. Paper; 7x10½ in.; pp. 52; halftones, linecuts, tables. Published by the Instituto de Pesquisas Technologicas de S. Paulo, Sao Paulo, Brazil.

DOSAGEM DOS CONCRETOS—By Ary F. Torres. Bulletin No. 1, September, 1936, 3rd revised edition. Paper; 7x10½ in.; pp. 62; charts and tables. Published by the Instituto de Pesquisas Technologicas de S. Paulo, Sao Paulo, Brazil.

ANNUAL REPORT OF THE EGYPTIAN GOVERNMENT: Ministry of Public Works, 1924–25, Part I; 1926–27, Parts I and II; 1927–28, Parts I and II. Board; 7x11 in.; Published by Government Press, Cairo, 1931. Price of each volume P.T. 20.

BROWN FLOW METER ENGINEERING HANDBOOK—Compiled by Louis Gess and J. O. Feldmark. Fabricoid; 8x10½; pp. 162; halftones, linecuts, tables. Published by the Brown Instrument Co., Philadelphia, Pa. Price $2.

ANALYSIS AND CONTROL OF LANDSLIDES—By Robert Graham Hennes. Bulletin 91, University of Washington Engineering Experiment Station, June, 1936. Paper; 6x9 in.; pp. 57; tables and diagrams. Published by the University of Washington, Seattle, Wash. Price 50c.

A. S. T. M. STANDARDS—1936 (Issued triennially). Part II — NON-METALLIC MATERIALS. Cloth; 6x9 in.; pp. 1477; halftones, linecuts, tables. Published by American Society for Testing Materials, Philadelphia, Pa. Price $8.50.

CATCHING UP WITH HOUSING—By Carol Aronovici and Elizabeth McCalmont. Fabricoid; 5x7 in.; pp. 243; halftones, linecuts, tables. Published by Benefit Management Corp., Newark, N. J. Price $2.

PRESENTATION OF THE BUST OF LORD KELVIN TO THE SMITHSONIAN INSTITUTION BY THE ENGLISH-SPEAKING UNION. Board; 5x8 in.; pp. 40; halftones. Published by the English-Speaking Union, Washington branch, Washington, D. C.

THE PORTS OF LOS ANGELES AND LONG BEACH, CALIFORNIA—Port Series No. 13, Part I (Revised 1936). Paper; 6x9 in.; pp. 227; halftones, tables, maps. Published by the Board of Engineers for Rivers and Harbors, War Department, Corps of Engineers, U. S. Army. For sale by Superintendent of Documents, Washington, D. C. Price 35c.

ROADSIDES, THE FRONT YARD OF THE NATION—By J. M. Bennett. Cloth; 5½x8 in.; pp. 233; halftones. Published by The Stratford Co., Boston, Mass. Price $3.

KNICKUNG KIPPUNG BEULUNG — By Friedrich Hartmann. Paper; 7x10 in.; pp. 201; linecuts. Published by Franz Deuticke, Leipzig and Vienna. Price M. 18.40.

JOURNAL OF THE ASSOCIATION OF CHINESE AND AMERICAN ENGINEERS—Vol. XVII, November-December 1936, No. 6. Paper; 6½x9¼; pp. 87; halftones, linecuts, maps, tables. Published bimonthly by the Association, Peiping, China. Price per year $3.

HYDRAULIC AND ROAD QUESTIONS IN CHINA—A Review of the Report by the Committee of Experts of the League of Nations. By O. J. Todd and Sig. Eliassen, with comments by Hsu Shih-ta, Li Shu-tien, Kao Ching-ying and C. C. Chang. Paper; 6½x9¼ in.; pp. 24. Reprinted from the Journal of the Association of Chinese and American Engineers, Peiping, China, Vol. XVII, No. 6, 1936.

PRINCETON LOCAL GOVERNMENT SURVEY—Local Government in New Jersey. Pocket Report Series, Vol. 2, No. 1. THE BUDGET PROCESS IN LOCAL GOVERNMENT. Paper; 5½x8 in.; pp. 37; tables. Published by the Princeton University Press, Princeton, N. J.

MUNICIPAL BONDS—A CENTURY OF EXPERIENCE—By A. M. Hillhouse. Cloth; 6x9 in.; pp. 579; tables. Published by Prentice-Hall, Inc., New York. Price $5.

PUBLICATIONS OF THE INTERNATIONAL ASSOCIATION FOR BRIDGE AND STRUCTURAL ENGINEERING — Fourth volume, 1936. Paper; 7x9½ in.; pp. 651; halftones, linecuts, tables. Published by the General Secretariat, Zurich, Switzerland. Price 30 fr.

SECOND CONGRESS OF THE INTERNATIONAL ASSOCIATION FOR BRIDGE AND STRUCTURAL ENGINEERING—Oct. 1–11, 1936. Preliminary publication, English edition. Cloth; 7x9½ in.; pp. 1582; halftones, linecuts, tables. Published by Wilhelm Ernst & Sohn, Berlin. Price 25.50 RM.

THEORY OF MODERN STEEL STRUCTURES—Vol. I—DETERMINATE. By Linton E. Grinter. Cloth; 6x9 in.; pp. 317; halftones, linecuts, tables. Published by the Macmillan Co., New York. Price $4.

CONVENTION PROCEEDINGS 1935–1936 AMERICAN ROAD BUILDERS' ASSOCIATION. Fabricoid; 6x9 in.; pp. 992; halftones, linecuts, tables. Published by the American Road Builders' Association, Washington, D. C. Price $10.

BITUMEN AND PETROLEUM IN ANTIQUITY—By R. J. Forbes. Cloth; 6x10 in.; pp. 109; halftones, linecuts, maps. Published by E. J. Brill, Leiden, Holland.

WIND-PRESSURE ON BUILDINGS—Experimental Researches—Second Series. Pamphlet No. 42. By J. O. V. Irminger, Chr. Nokkentved; translated by Alexander C. Jarvis and O. Brodsgaard. Paper; 7x10 in.; pp. 85; tables and charts, numerous appended diagrams. Published by Danmarks Naturvidenskabelige Samfund, Copenhagen, Denmark. Price 10 Kr.

WATERWAY ENGINEERING — By Otto Franzius. Translated by Lorenz G. Straub. Cloth; 6x9 in.; pp. 527; halftones, linecuts, maps, tables. Published by The Technology Press, Massachusetts Institute of Technology, Cambridge, Mass. Price $7.

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Letters to the Editor

Tennessee River Valley Studied by Army Engineers

Col. Fiske describes thoroughness of research into storage and river improvement before 1933

Sir:—The article, "The Tennessee River Experiment" in your issue of Dec. 3 contains some inaccuracies which, knowing your standards in such matters, I feel sure you would prefer to remove.

Near the top of column three, p. 772, is found this sentence, "Meantime the army engineers at the direction of Congress had made a new study of Tennessee River navigation development, with some headwater storage as part of the project to increase low-water flow." Quite unintentionally on your part I am sure, the phrase "with some headwater storage as part of the project" may suggest to the uninformed reader that the army engineers treated the storage question in a superficial manner, whereas it would be better to make clear the fact that this subject was investigated by them with a thoroughness without precedent in any comparable general study. Some evidences of this thoroughness follow.

Investigation recommended in 1921

The first is the recommendation which inaugurated this army study or survey. This will be found in H. R. Doc. 319, 67th Congress, 2d Session, p. 82, par. 200. It was submitted Jan. 15, 1921. Among other things this paragraph recommended "(b) That in making this survey there be included studies of all present or potential hydro-electric developments, the mineral and industrial resources of this basin, floods, drainage, and such other allied subjects as may have an appreciable influence on any project for river improvement that may finally be recommended, or as may reasonably appear to be necessary for protecting the interests of the government when issuing permits for any proposed development by private parties that may in any way affect or have a bearing on future navigation of this river system. (c) That these additional studies be as thorough as the law or the desires of Congress and available funds will permit."

The final report on this survey was printed as House Doc. 328, 71st Congress, 2d Session, Parts I and II. On p. 29, par. 4, Part I, the total cost of the survey or study *inclusive* of the special investigation of the Cove Creek dam site was $1,090,800. Also see p. 3, par. 10, "The system [recommended] includes 149 power developments, together with certain auxiliary steam stations," and "The total estimate of cost given (for the recommended project) is $1,200,000,000." In Part II, Plate 7 shows the location of these 149 dams and indicates that about 60 of them are reservoir projects. I do not know of anyone who feels that this survey overlooked any storage possibilities in the basin of the Tennessee.

High dams for navigation

At the top of column two, p. 775 of your article, appears this sentence, "The Authority's first task therefore was to plan for adequate navigation depth and facilities." In Doc. 328, Part I, p. 2, par. 9, the Chief of Engineers, referring to Plates 7 and 8, which give a plan for all possible uses of the waters of the Tennessee Basin, says, "The construction of the works on the main stream would provide for a navigable depth of 9 ft. from the mouth of the river to Knoxville, and depths of from 9 to 6 ft. for a considerable distance up all the major tributaries."

In this case I believe that your statement is in error and that further investigation of this subject will convince you that the statement of the Chief of Engineers is correct. That is, the Authority at no time has had the "task of planning adequate navigation depth and facilities." It has had only to carry to final detail entirely adequate preliminary plans of this type provided by the army survey.

Just below the middle of column one, p. 777, your article states, "A series of high main-river dams was early found preferable to the numerous low dams previously contemplated; ***" Please note that Plates 7 and 8, which give the plan contemplated by the army survey, show only high main-river dams. Further note on p. 97, Part I, Doc. 328, par. 78, which reads, "Plan D—Navigation only.—All of the above plans for the development of the waterway require the cooperation of power companies. *That a sound basis for such cooperation may be had*, it is essential that a satisfactory project for a progressive development of the main stream for navigation alone be adopted by Congress. *With this in view*, a plan has been prepared which contemplates the improvement of the Tennessee River from its junction with the Ohio to Knoxville by a system of 32 locks and dams of relatively low lift, which system has been designed to afford navigation facilities on a par with those now existing on the Ohio River." This means that the 32-low-dam Plan D was introduced for the purpose of determining what the government might contribute to the cost of a high-dam system in any coperative arrangement with private power companies, the remainder of the high dam cost to be paid by the power interests. It is true that the Wheeler Dam was started on the low-dam basis, for reasons unknown to the writer, and the task of the Authority was to put back the Wheeler Dam to the high-dam basis and to modify policies so as to have all construction done by the government alone instead of on a government-private company basis which had been the only one considered by the Administrations prior to March 4, 1933.

The sentence last quoted from your article continues, "Norris Dam was built to a greater height than the army engineers had recommended, so as to perform better equalization service; headwater storage on other tributaries was found essential; the various reservoirs were carefully proportioned for best cooperation." In the "Report to the Congress of the Unified Development of the Tennessee River System, submitted by the Board of Directors of the Tennessee Valley Authority March 1936," p. 95, are found the following figures; Maximum level, Norris (Cove Creek) reservoir 1,052 ft. normal level 1,020 ft. above mean sea level. In Doc. 328, Part II, Plate 74, are found the following for the Cove Creek Reservoir:

Maximum elevation 1,057 ft., full pool 1,050 ft. Your statement is in error; the Authority has lowered, not raised, the army elevations for Norris Dam, this for better or worse as the case may be. The remainder of your sentence just quoted is correct if it means, "headwater storage on other tributaries was found essential *by the army engineers*; the various reservoirs were carefully proportioned for best cooperation *by the army engineers*." A study of Plates 7 and 8 will convince you of the justice of this interpretation.

Complete surveys and maps

Closely following the last quotation from your article comes this, "Since no satisfactory maps of the region were available, a co-operative program was entered into with the U. S. Geological Survey to provide planimetric and topographic maps for locating dam and reservoir sites, for estimating the lands and improvements that would be flooded, for planning railroad and highway relocations, for general land-use studies, and regional planning." General land-use studies of the Authority of course could not and did not have any place in the army survey. For these purposes the U. S. Geological Survey has prepared additional maps as you have stated. Planimetric and topographic

maps for locating dam and reservoir sites, for estimating lands and improvements that would be flooded and planning railroad and highway relocations were provided by the army survey and I believe that further investigation will convince you that these have been found so satisfactory by the Authority that neither it nor the U. S. Geological Survey has yet provided a single sheet for these purposes, except perhaps for additional maps required for moving the lowest dam in the basin from Aurora Landing downstream to Gilbertsville.

Finally, 1 on p. 772 of your article are these statements, "But the simple fact is that, whatever else the measure does, it authorizes and directs complete development of the Tennessee River. And this, as just stated, is a revolutionary innovation." These statements in one form or another have appeared in many articles in various publications. They have very generally been accepted as meaning that the TVA and its program is a revolutionary innovation introduced by the present Administration and as such it is considered to be highly creditable or discreditable according to the reader's point of view.

For your thoughtful consideration I submit the statement that the proper status of the TVA and its policies as a national enterprise, the degree to which it can be considered to have created an innovation and the attitude of Administration leaders for the past sixteen years toward the unified development of the Tennessee Basin, all these can be more fairly judged from a full consideration of the following facts:

(1). The army survey originated with the River and Harbor Act of June 5, 1920, Sec. 2, and the verbal and written instruction of the Chief of Engineers dated June 30, 1920 (See p. 9, Doc. 319.)

(2). The recommended policy for the comprehensive survey is quoted in the third paragraph of this letter (par. 200 (b) & (c) of Doc. 319), and it is submitted that this is as good a neo-TVA policy as could have been written in the winter of 1920-21.

(3). Up to this point this activity was fostered by the Administration of President Wilson.

(4). During each of the successive administrations of Presidents Harding, Coolidge and Hoover this survey received their moral and financial support to the extent that the scope and cost of the survey was increased from the first recommended cost of $515,800 (See p. 3, Doc. 319) to the actual final total $1,090,800.

(5). In the Administration of President Roosevelt facilities and funds were provided to permit the actual construction to begin, and certain changes were made in policies. These changes were: (a) From a development by the government in cooperation with private power companies the project became one for development by the government alone, and (b) to the former interests of the survey were added, to use your phraseology, "General land-use studies, regional planning and other purposes."

From the foregoing perhaps you will concede that there is room for discussion as to the date which should be set for the first appearance of this innovation and also that many of the fundamental policies of the Authority have had the active support of five successive administrations in Washington. It does not seem that recognition of the foregoing facts should in the least detract from the credit in this matter due to the present Administration or to the Authority. After all, doing ranks above planning to do. It is to the credit of the President and the Authority that they were able to use and expand this preliminary study which they found ready and waiting for them.

Chattanooga, Tenn.,
Dec. 15, 1936

HAROLD C. FISKE,
Col. U. S. Army, Retired;
Chairman, Electric Power
Board of Chattanooga.

Beam Deflection Once More

Sir—The college instructor or the structural engineer who wishes that no further methods of determining beam deflections be brought forth will wish in vain. New methods and restatements or modifications of present methods will continue to be invented or reinvented by each succeeding generation of technical writers. A method that has found a place in one textbook is presented by Jules D. Gedo in his "Theory of Superstatic Structures," 1934. This method with the enlargement thereon by Professor Boyd in the recent edition of his "Strength of Materials" will eventually be given space in others.

The Frankel formula for the deflection of a beam when I is constant is

$$d = \frac{1}{EI} \int M_p \, M_q \, dx$$

in which M_p = bending moment due to a load unity placed at the point on the neutral axis where the deflection is desired; and M_q = bending moment at the same point due to the given loading.

Mr. Gedo shows that for the M_q diagram of any shape whatever, if the M_p diagram is bounded by straight lines,

$$M_p \, M_q = A_g \, h_p$$

in which A_g = area of the M_q diagram; and h_p = altitude of the M_p diagram under the center of gravity of the M_q diagram. The equation is also presented in an earlier book by Mr. Gedo, "Das Krafteplan-Verfahren," Leipzig, 1932.

Professor Boyd in his "Strength of Materials," Fourth Edition, 1935, illustrates the application of the foregoing. He uses the accompanying diagrams in deriving the equation of the elastic line for a simply-supported beam carrying a load Q at a distance b from the right support. It will be noted that the M_p diagram as shown in the figure is reversed. This improvement is original with Professor Boyd. He writes, "Since the resultant moment from any set of forces is the same, no matter which way it is calculated, the result is the same whether the M_p and M_q diagrams go in the same or in opposite directions."

In the example of deriving the equation of the elastic line for a simply-supported, uniformly loaded beam, he writes, "If the dummy force is at a distance x from the left end, the dummy reaction at the right end is $-\frac{Px}{l}$ and the altitude of the dummy triangle is a simple function of x. Moreover, the areas which accompany the positive dummy triangle are a triangle and a parabola, instead of a trapezoid and a truncated parabola."

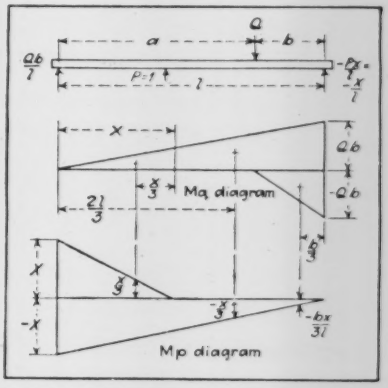

DIAGRAM for concentrated load and dummy load used in determining beam deflection.

ROBINS FLEMING

New York, N. Y.,
August 8, 1936

Measurement of Dam Heights

The continuity of one paragraph of the article entitled "How Shall the Height of Dams Be Measured" published on pages 816 and 817 of our issue of December 10 was destroyed by the loss of three lines of type between pages 816 and 817. The paragraph beginning at the bottom of page 816 should read as follows:

Now that a seismic factor sometimes is taken into account in dam design, the proportions of the structure depend on debris load, depth of backwater, total mass of dam and other factors connected with height. One engineer makes a considerable point of studying the unbalanced fill as a factor in the effective maximum load which a dam can withstand. Again, if the dam goes a considerable depth below tailwater in full section this height may require even more careful consideration than the portion above tailwater; tailwater reduces the effective weight of the submerged portion by buoyancy without helping much by back pressure at this level.

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December 31, 1936

New Year's Promise

WITH THE CLOSE of a year marked by engineering achievement and growth of scientific skill, the engineer turns to ponder what the new year will bring. Will the advance of the art continue, or is it approaching a limit? He looks back over a long history of growth; must there not come a time when the growth will end? The very nature and cause of that growth give answer: The past has brought with each new year an increase of demand on engineers as the world's planners and builders, placing before them tasks previously beyond attainment, and always the demand has been met. Every step forward has been the preparation for successful attack on something more difficult, undertakings that up to then seemed dreams of fancy—bridge spans of impossible boldness, new paths of travel broken through insuperable barriers. And so once again it is the hope and promise of the day that the year just opening will see engineering achievement move forward hand in hand with human ambition and striving. There will be no end to increased knowledge and construction skill.

Coming Trends

ALREADY THE VIGOR of renewed growth foreshadows more difficult construction. To this severer service the engineer must of course bring a new temper of mind. The world is moving forward with strength accumulated during its recent years of enforced rest, and it can hardly fail to follow pathways different from those of former days. Unless engineers see their tasks in the light of current needs they may not be able to keep pace. Where they were content with merely solving mechanical problems, they are now being asked to consider the usefulness of their work to mankind, and in order to do this they must look on their problems in a new light. The call for a broadened conception of engineering activities is especially clear in the field of transportation; we are beginning to understand that the work to be done is to create means of transport service in place of merely building and operating roads, or railways, or bridges. But every other field carries the same message. There is harder work ahead for the engineer, and he must bring to it not alone improved method and greater power but also a larger understanding of the trends of human advance, to the end that his work may endure and serve.

Bridges and Earthquakes

THE THREE BRIDGES which the U. S. Bureau of Public Roads is building on the Pan-American Highway in Central America were designed with the probability of earthquakes in mind. Last week's series of devastating quakes in central El Salvador, gave warning that the adequacy of the designs will probably be tested during the life of the structures. And bridge engineering will benefit thereby. The bridges are all of suspension design, a type that theoretically has inherent earthquake resistance because of its flexibility and its low center of gravity. Furthermore, three variations of suspension design are used—single span with unloaded backstays, double span with loaded backstays, and single span with self-anchored cables. All towers are designed for an earthquake factor of 10 per cent of their weight. In addition to providing crossings of flashy Central American streams, therefore, the new bridges should sometime furnish a full-size laboratory check on our theories of designing bridges to resist earthquakes. Present experience warrants the belief that the new structures of the Pan-American highway will prove amply resistant.

Keeping the Door Open

IN REFUSING TO ISSUE A LICENSE at this time for the initial work on a great water-power development in Z Canyon on Clark Fork of the Columbia River, and at the same time issuing a license for a small power project a few miles upstream, the Federal Power Commission has taken commendable care to assure that the small development will not become an obstacle to the ultimate larger development. Too often in the past small projects have been permitted to throttle larger and more economical developments. The Z Canyon project has possibilities for developing 650,000 hp., power that some day may be needed for metallurgical use; but the power commission could find no evidence that a market yet is available for even the first-stage power of the larger development, nor could the applicant, Hugh L. Cooper, prove to the commission that he could finance the project. The small development for which the commission issued a license was approved only on condition that it will give way to the larger project at some future date without claim for damages. By this arrangement power is made available for a present need, and service is given to a mining enterprise whose development will hasten the day when the larger project is needed.

Practical Aids

KNOWLEDGE of how to handle concrete materials, both before and after mixing, has been extended rapidly in recent years, and the methods applied in the practice of important jobs, where expert direction prevails, accomplish all that is required, with a margin to spare. It is the average job on which standards yet need to be raised; here, despite the advance of laboratory knowledge and job procedure, practice remains the weak link in the chain. Examples are all too frequent. Good concrete in the same structure with poor concrete gives proof that the builders had the right formula and could have turned out a superior product had they not allowed carelessness or wrong methods to make consistent results impossible. Recognition of this weakness and a step toward meeting it appears in an educational plan devised by L. H. Tuthill, testing engineer of the Metropolitan Water District of Southern California, who has prepared for the benefit of contractors a sheet of sketches showing by text and in graphic description right and wrong ways of stockpiling and loading, shaping bin bottoms, dumping concrete, and the like. His lesson sheet, reproduced on another page of this issue, should do much to minimize the risk of segregation and thereby to assure better concrete. Such practical aids to the written and spoken word do much to help educate the man in the field and to improve the average of construction standards.

Experiment and Results

OPINIONS DISAGREE, and disagree violently, on whether the experiment in progress down in the valley of the Tennessee is good or bad. They differ according to individual views of the motive and the purpose of the experiment. But there is no such room for difference of view as to the physical nature of the experiment; as outlined in the series of articles concluded in this issue the Tennessee Valley Authority's undertaking consists of controlling and developing the river to give protection from its destructive actions and to utilize its resources as fully as possible.

A like piece of pioneering in development of natural resources has not been witnessed since federal reclamation was begun, nearly 35 years ago. The TVA is making the first attempt to develop a large river comprehensively, and the importance of this attempt lies in the very reason that made prior attempts impossible—the fact that no one person, group or community was sufficiently concerned in more than a single phase of control or development for a comprehensive undertaking.

What has the TVA done for the Tennessee Valley? What has it done to establish principles and procedure that will apply to other stream-basin development? These questions are in order now that the TVA has been at work nearly four years and has spent its first hundred million.

Results accomplished for the Tennessee Valley itself are extensive. The TVA has done much work of permanent value to benefit the Valley. It has made a good beginning on a complete navigation system, on flood control, on water conservation, and on provision for power production. It has studied soil conservation problems, is in process of creating a new attitude toward farming in the Valley, has discovered a new economic resource (the recreational possibilities of the region), and in many ways has contributed to establishing a sounder regional economy.

Its work for the Valley is, of course, incomplete. It has not as yet carried its planning for conservation and flood control to completion; it has not shown how the additional power to be obtained from the stream will be made a constructive, wealth-building resource of the Valley, or how it may be coordinated with existing power resources; it has not demonstrated a way to assure general and permanent soil conservation; its program of subsidizing the demonstration farmers with free fertilizer is at best an uncertain reliance.

Also, it has so far failed to bring about the general participation of the Valley's people and institutions in its undertaking. And—surprisingly enough—it has failed to develop a general plan or program of its own operations; perhaps it may be said that there are three separate plans, of which one, the cultural and farm program, is a fragment, while another, the power program, is involved in bitter dispute and has never really been stated in tangible terms.

But though the work is incomplete, the Valley may justly take pride and satisfaction in it. Whether the accomplishment to date is worth the hundred millions spent, and whether any large national benefit will be derived from the expenditure, is anybody's guess.

As to the value of the TVA's work in showing how basin-wide stream development can be carried out elsewhere the answer is less satisfactory. It has shown that the technical problems of such work can be solved, and that large and important river works can be built efficiently, economically and rapidly when the work is entrusted to able men with adequate authority. But the questions which it has not answered are more weighty.

It has not shown that regional cooperation can be secured. It has not proved that comprehensive river development is economically justified or is a wise thing to undertake. And as for the next necessary step, that of creating the necessary systems of organization, finance and administration for carrying on a comprehensive basin-development enterprise, it has neither presented a model nor even explored the problems involved. What the TVA has done, therefore, is of little effect in demonstrating either the local or national value of stream-basin development and lays no foundation for a future stream-development policy.

The picture drawn is of necessity incomplete, and in so far as it is unfavorable the blame rests more on Congress and the President than on the Authority. The problem and the task assigned to the Authority are of huge proportions, probably much larger than anyone foresaw; foresight was limited because the work was started as an unemployment relief project and because it was intended to produce a power yardstick. In the light of today the undertaking obviously was too vast to warrant one in expecting more than a beginning. Even so, the results might be more convincing if, simultaneous with construction, a thorough study of the economic, administrative, financial and social phases of river development had been begun.

Some of the outstanding shortcomings in TVA performance trace back to the failure of the basic legislation to require a substantial measure of local participation. Certain other shortcomings are clearly due to the Board's failure to act as a unit. Its unfortunate split dates back to the very first days, when two members of the Board combined to make unit action impossible (perhaps in intent; certainly in effect). The results of this split are sensationally characterized by the fact that part of the Board knew nothing of the power rates promulgated by TVA until they were published in the newspapers.

Underlying this administrative lack of harmony as well as the weakness of the basic legislation is the fact that certain elements in the government have no other aim than to set up a public power system without regard to whether or not it is placed on a business basis or is logically related to other phases of stream development. Had power from the beginning been made incidental to stream development, as it is in fact and in law, the project might present a far different picture today. The result is the more regrettable because a definite, business-like policy on power would have cleared the situation for the Tennessee Valley and for all other comprehensive stream-basin undertakings that may be found necessary.

In summary, appraisal of three and a half years of TVA operations leads to the conclusion that the TVA has made a remarkable record in dam building and hydrologic planning, but that as an agency for broad regional development its accomplishments are disappointing. Its work is of little use as a guide to the planning of like regional development elsewhere. The outcome and lessons of the Tennessee Valley experiment are as problematic as they were on the day the TVA was established, and no one can yet say that the hundred million of public money spent on it is a good national investment.

CURRENT NEWS

License Refused For Z-Canyon Power

Federal Power Commission declines to license big power project but approves small one

The Federal Power Commission, on Dec. 19, denied the application of Hugh L. Cooper, New York, for a license to develop power at the Z-Canyon site on the Clark Fork of the Columbia River, 9 miles north of the town of Metaline Falls, Pend Oreille County, Wash. This is in the northeast corner of the state about 90 miles north of Spokane. Mr. Cooper received a preliminary permit for the development of 650,000 hp. at the Z-canyon site in 1928 and has been working on it continuously since that date. He proposes to develop it in three steps, the first step consisting of a temporary concrete dam with a crest at El. 1,827 ft., a power tunnel 32 ft. in diameter to a power house containing two units of 15,000 hp each; the second step adds two more power units, and the third step calls for construction of a concrete arch dam raising the reservoir level to El. 2,027 ft. and the construction of a second tunnel 40 ft. in diameter.

In denying the application for a license the commission stated that the applicant had failed to show ability to finance the proposed project or to show that an adequate market for the power was available. The application was denied without prejudice to the applicant's right to renew.

On the same day the Federal Power Commission granted the right to the Pend Oreille Mines & Metals Co. of Spokane, Wash., to construct a small power plant at Metaline Falls in the area to be flooded by the Z-canyon project; but in granting the license the commission imposed the special condition that the government reserves the right to issue a license for a hydro-electric power project for the complete development of the site at some future date. The present licensee will not be entitled to damages for the destruction of its project or project works when the complete development is undertaken.

The work authorized under the license issued to the Pend Oreille Mines & Metal Co. consists of an intake above the falls, a tunnel about 600 ft. long, a power house below the falls with a 2,000 hp. capacity.

Studies for the larger project are being continued.

Contract Awarded for Denver Water Tunnel

The contract for construction of the three-mile tunnel to bring water from Williams Fork River to dilute the effluent from the Denver sewage plant (*ENR*, Dec. 24, 1936, p. 909), has been awarded to Broderick & Gordon of Denver on their low bid of $556,000. This bid is $60,000 below the estimate.

Wide World Photo

EARLY EXAMPLE OF IRON FRAME CONSTRUCTION DESTROYED BY FIRE

THE CRYSTAL PALACE, near London, destroyed by fire on Nov. 30, was a huge iron and glass building possessing both structural and historical interest. Built originally in Hyde Park for the International Exhibition in 1851, it was afterward taken down and reerected at Norwood, a southern suburb, as a permanent structure for exhibitions and entertainments. A brick building had been proposed, but Mr. (afterward Sir) Joseph Paxton, while presiding at a railway meeting, casually sketched on a blotter a skeleton framing of wrought and cast iron, with walls and roof of glass. The idea was based on the design of a conservatory which he had built.

As erected originally in Hyde Park, the building was cruciform in plan, with the main stem about 1,800 ft. long and a cross arm or transept of 480 ft. The nave was 72 ft. wide, with an arched roof 180 ft. high. This was flanked on each side by one-story and two-story bays of 24-ft. and 48-ft. widths with flat roofs. The entire roof was of the ridge and furrow type, covering an area of nearly 20 acres. As rebuilt in 1854, it was enlarged and had two towers 238 ft. high.

The destruction of the building in the fire was complete. A tangled wreckage of wrought iron framing and trusses covered the site, only the towers remaining standing.

The blotter on which the original design was sketched is preserved in London.

Mile-Long Tunnel Replaces Highway Built Over Ore Bed

The highway between Bingham and Copperfield in Salt Lake County, Utah, is built over ore-bearing lands owned by the Utah Copper Co. The company, in order to develop the ore field by open-cut mining, has completed an agreement with the county by which it will, at its own expense, replace the highway with a 6,998-ft. tunnel under West Mountain between the two towns at a cost of about a million dollars.

The tunnel, carrying two traffic lanes and a pedestrian walk, will have a minimum width of 16 ft. 4 in., and a height of 10 ft., and will be concrete lined.

Under the terms of the agreement the company will obtain all necessary rights-of-way and build the tunnel before the existing highway is abandoned. The mining company retains the right to install and maintain air lines, fresh water lines, copper solution lines and electric feeder lines at its own expense. It will also, however, purchase and install in the pipe conduit which is provided for in the plans an 8-in. sewer pipe for the county, which will receive title to and maintain the sewer. During the first two years of operation, the county will make tests of the lighting, traffic control and ventilating equipment within the tunnel. Should it deem the equipment inadequate, the company must replace or supplement the equipment at its own expense. The company is also obligated to bear the cost of repairs to the equipment and must reimburse the county for expenses incurred in maintaining the side walls and ceiling or in repairing damages caused by earthquakes or any other earth disturbance. The company also agrees that if at any time the company's operations are suspended or terminated, it will build, at its own expense, a surface highway around the perimeter of the mine pit to such standards as may be required by the county. Such a highway would then be deeded to Salt Lake County which, upon acceptance of it, would abandon the vehicle tunnel.

Construction of the tunnel, which is expected to begin shortly, will take about a year to complete.

San Diego Studies Aqueduct Water

Colorado River aqueduct system in fourth year of construction is more than half finished

San Diego, Calif. officials, studying plans for the development of an additional water supply for the city, have been conferring with officers of the Metropolitan Water District of Southern California to discuss the possibility of San Diego's securing Colorado River water through the Colorado River aqueduct. The water supply studies are being made by an engineering consulting board composed of Louis C. Hill, of Los Angeles, Lester S. Ready, of Berkeley, and Dr. John P. Buwalda, of Pasadena.

During the past year the Metropolitan Water District has received inquiries concerning the possibility of joining the district from cities and areas totalling about 400,000 acres and extending from Ventura County to San Diego. A recent ruling of the board of directors specifies that aqueduct water will be sold only to cities in areas that are members of the Metropolitan Water District.

General Manager Weymouth of the Metropolitan Water District announced on December 12 that, on completion of the first four years of construction, the 392-mile Colorado River aqueduct system is more than half completed. Construction of the aqueduct, which will eventually carry a billion gallons of water a day to the members of the District, was started in December, 1932. During the past four years 102 mi. of tunnels have been excavated, 73 mi. of which have been lined with concrete and completed. In addition to the tunnels, more than 133 miles of canals, conduits, and syphons have been concreted, 4,200,000 cu.yd. of earth has been placed and compacted in the building of the aqueduct terminal reservoir near Riverside, and 150 miles of electric power transmission lines have been erected to carry electrical energy from Boulder Dam to the five pumping plants now under construction.

At the present rate of progress, district officers believe that the aqueduct will be put into operation early in 1939.

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Electric Welding Concern Forms Research Foundation

The Lincoln Electric Company is establishing at the beginning of the year a fund and foundation to encourage research in arc welding. The new fund is to be known as the James F. Lincoln Arc Welding Foundation, so named in honor of the president of the Lincoln Electric Company. The principal direction of the foundation's work will be undertaken by Dr. E. E. Dreese, chairman of the Department of Electrical Engineering of Ohio State.

Dr. Dreese has been professor of electrical engineering at Ohio State since 1929 and chairman of the department since 1930. He is the author of numerous papers presented before the American Institute of Electrical Engineers.

It is expected that directors of the foundation will complete organization of a comprehensive program at an early date, and that the foundation will announce the first of its activities by the end of January.

Court Declines to Consider Army Engineer's Record

A case that stirred engineering circles deeply nearly 40 years ago was brought into the spotlight for a few hours recently when Oberlin M. Carter, one-time captain in the Corps of Engineers, U. S. Army, appealed to the district court of the United States for the District of Columbia to set aside the findings of a court-martial to which he was subjected in 1898. The district court held that it had no jurisdiction to review the court-martial record and so dismissed the case, but noted an appeal in order that Carter could take the case to a higher court if he so desired.

In 1897 sensational charges of conspiring with the contractors who had built jetty and other harbor work at Savannah, Ga. under his direction were preferred against Captain Carter, then considered one of the brilliant young officers of the Corps of Engineers. It was claimed that the government had been defrauded of $2,500,000.

A court-martial was convened in January, 1898 and sat until the outbreak of the Spanish War at the end of April, taking more than 5,000 pages of testimony. The case attracted wide attention because of Captain Carter's prominence and the prominence both of engineers who testified for him and those who testified for the government. The court found Captain Carter guilty and sentenced him to five years' imprisonment, a fine of $5,000, and dismissal from the army. After a long delay in which the decision was subjected to critical review, the President approved the court's findings. Since that time Carter, always maintaining his innocence of guilt, has endeavored to have the findings of the court-martial set aside.

LONG RAILWAY-HIGHWAY BRIDGE COMPLETED IN DENMARK

THE 50-SPAN Storstrom Bridge in Denmark, which is about the same length as the Tay Bridge, usually credited with being the longest bridge in Europe, was completed on Dec. 5, more than a year ahead of contract time.

This bridge, with the nearby Masnedsund Bridge, forms a direct link between the Islands of Zealand and Falster. The Storstrom Bridge, about 10,530 ft. long, carries an 18½-ft. roadway, an 8-ft. sidewalk and a single track, standard gage railroad.

The bridge rises from each end toward the center at a gradient of 1 in 150, providing a clear headroom for shipping of about 85 ft. at the three navigation spans. The center navigation span is about 450 ft. between piers and the two side spans about 340 ft. The remaining 47 approach spans are alternately 190 ft. and 204 ft. between piers.

The navigation spans are stiffened tied arches. The arch ribs are of box section type, about 3 ft. deep, and the stiffening girders are single-web plate girders 12 ft. deep. The girders are about 40 ft. apart. The hangers, of built-up section, are about 30 ft. apart, and plate cross girders 4 ft. deep are framed into the stiffening girders at the hanger points. The footway is supported by brackets cantilevered from the cross girders. The roadway is a concrete slab surfaced with asphalt, and the railway track is carried on timber transoms laid with planking.

Lateral wind systems are provided in the plane of the arch ribs and at the level of the bottom flange of the stiffening girders.

The approaches are deck spans of the cantilever type with suspended spans and anchor arms located in alternate openings. The main girders are plate girders 12 ft. deep and 24 ft. apart. The cross girders, 3 ft. deep and spaced 14½ ft. on centers, bear directly on the top flange of the main girders. The footway is reinforced concrete cantilevered from the roadway slab.

The Storstrom Bridge was built by the Dorman Long Co. of Darlington, England, at a cost of about $10,000,000. The total weight of steel work in the bridge includes 21,000 tons of fabricated steel work, 3,000 tons of steel reinforcement for the bridge deck and the piers, and 5,000 tons of steel piling for the piers and abutments.

Concrete Institute to Discuss Joint Committee Report

The 33rd annual convention of the American Concrete Institute will be held in New York City at the Roosevelt Hotel from 2 p.m., February 23, through the afternoon of February 26. The decision to hold a four-day rather than a three-day meeting came as a result of the announcement that the new report of the Joint Committee on specifications for concrete and reinforced concrete will be ready for presentation and discussion at this convention.

The principal departures of the new Joint Committee report from that of 1934 are to be found in the provisions for design. These give special consideration to the increasing use of the principle of continuity and the elastic frame analysis in the design of reinforced concrete structures. New provisions for designing reinforced concrete columns will be presented based on the results of the A. C. I. tests and recommendations. The specifications for proportioning of concrete mixtures are also modernized.

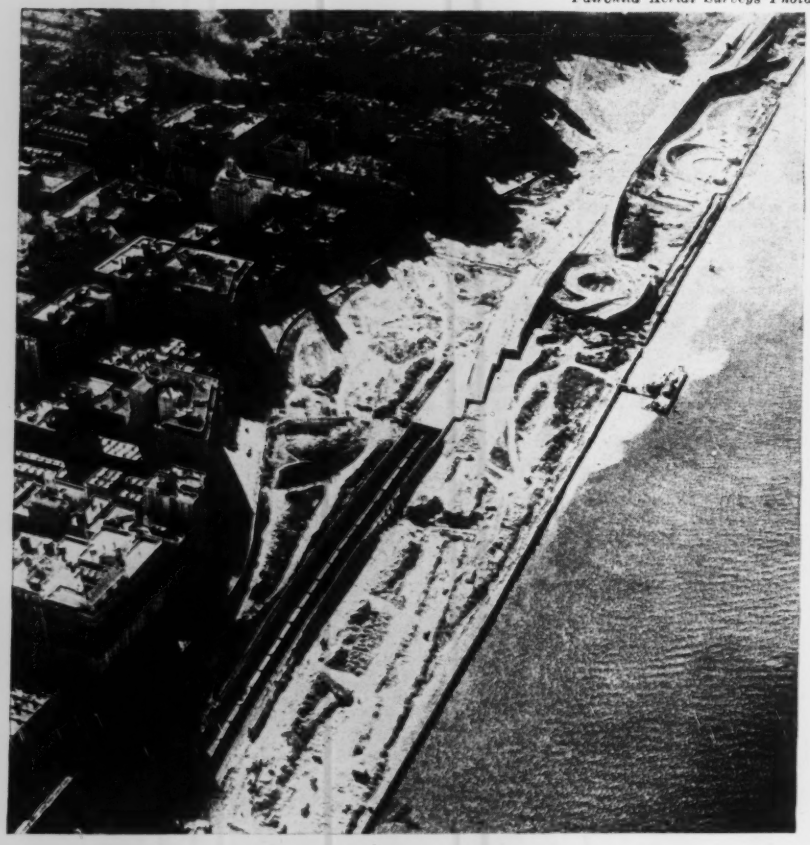
Other subjects to be featured in the program will be the repair and maintenance of concrete structures, new federal specifications for cement, new developments in concrete practice abroad, investigation of reinforced concrete knee frames, pavement concrete, and recent developments in foundation design.

TRANSFORMING A WATERFRONT PARK IN NEW YORK CITY

BY ADDING a parkway and burying a railway, New York's Riverside Park, extending for 50 blocks along the upper Hudson River waterfront, is being transformed into a usable recreation area. The sphere of operations here illustrated is at the south end of the project where the parkway connects with the existing West Side elevated highway at 72d St. For ten blocks the parkway is on the roof of the structure inclosing the New York Central freight line, but at 82d St. it curves to the west and descends to a location along the river bank. A train is shown entering the completed portion of the enclosure at 82d St. North of this point the track enclosure will be covered with fill so that the park will be uninterrupted from Riverside Drive down to the riverfront parkway.

Park facilities such as wading pools, playgrounds, formal gardens, promenades, boat stations, recreational field houses, and tennis courts also form a part of the current construction operations. In the above view the semicircular layout along the river front is a wading pool and small children's playground. The circular structure, of unusually complicated steel construction, accommodates the grade separation at 79th St. It also includes a parking area for sightseers; a parking garage is provided in the interior as are facilities for a kitchen in connection with a boat landing. A fountain will be installed in the center of the layout.

Fairchild Aerial Surveys Photo



Big Capital Outlay For New York City

Tentative departmental schedules ask $120,000,000 for water system, $23,000,000 for subway

Departmental requests for funds to meet capital expenditures during the period from April 1, 1937 to March 31, 1938 submitted as a preliminary to the preparation of New York City's capital outlay budget indicate that the board of water supply expects to spend $119,620,000 during the coming year on construction of the new Delaware River water supply system for the city. Appropriations already made for this project total $18,615,000, and it is expected that $253,972,000 will be spent on the project over the next nine years.

The department of hospitals asked for $53,560,000 for construction of new hospitals and for $7,202,000 for completion of hospital projects now under way. Of the new projects, a 1,500-bed general hospital for chronic patients on Welfare Island costing $5,500,000 is the largest. A new general hospital providing 600 beds in the East New York section of Brooklyn would cost $4,500,000, and a general hospital in Harlem with 500 beds is expected to cost $4,000,000. The full cost of all of these is asked for in the coming year.

The board of education asked for $59,528,000, of which $30,000,000 is for new projects, and $28,963,000 represents renewals of appropriations authorized in the 1936 capital budget. Of the new projects the largest is a $3,210,000 high school in the West Bronx. Other large projects are vocational high schools in Brooklyn and Jamaica, each to cost $1,680,000 and a vocational high school in East New York to cost $1,600,000.

The board of transportation expects to spend $23,508,000 on continuation of projects now under way and $33,823,000 on new projects. The greater part of the former group is for continuation of work on the Sixth Ave. subway. New passenger cars are expected to cost $9,700,000 during the coming year, and construction, equipment and cars for the Fulton St. extension will cost $10,000,000 during the coming year out of a total of $56,600,000. Six million is asked for construction and equipment on the $39,500,000 Rockaway line, and $5,700,000 out of a total of $9,500,000 for construction and equipment on the Concourse Line extension.

Contract Awarded for Lining For East River Tunnel

A $3,356,000 contract for manufacture, storage, and delivery of 54,000 tons of cast iron lining for the Queens mid-town tunnel under the East River in New York City has been awarded by the New York City Tunnel Authority to the United States Pipe & Foundry Co., which was the low bidder on the project.

Work will start on December 30 or 31 on the Manhattan ventilating building, with the breaking of ground for the foundation. The Tunnel Authority plans to advertise the main construction contract some time in January.

New Contract Drawn Up For Bayonne Terminal

A new contract between the City of Bayonne and Central District, Inc., the agency of the city for the promotion and construction of the proposed Bayonne port terminal, which is intended to meet the objections which led the New Jersey Supreme Court to throw out a previous agreement (*ENR*, Dec. 24, 1936, p. 909) has been drawn up and will be submitted to the City Commission on January 5.

The chief objection of the court to the previous contract was that it granted a monopoly to the Central Railway of New Jersey, which is to lay its tracks through the terminal. Exception was also taken to the fact that the Central Railroad enjoyed a reversionary interest in the title to about 200 acres of land.

Under the new contract, the Central Railroad of New Jersey will have exclusive trackage, but other railroads will have the right to rent use of the rails without discrimination under rates set by the Interstate Commerce Commission. The new contract also provides that the railroad shall deed to the city the 200 acres of riparian property on the New York Bay.

SOCIETY CALENDAR

ASSOCIATED EQUIPMENT DISTRIBUTORS, annual meeting, New Orleans, La., Jan. 10-12.

CANADIAN CONSTRUCTION ASSOCIATION, annual convention, Ottawa, Canada, Jan. 11-13.

AMERICAN ROAD BUILDERS ASSOCIATION, convention and highway exhibit, New Orleans, La., Jan. 11-15.

UNIVERSITY OF COLORADO, highway engineering conference, Boulder, Colo., Jan. 14-15.

AMERICAN ENGINEERING COUNCIL, annual assembly, Washington, D. C., Jan. 14-16.

AMERICAN INSTITUTE OF CONSULTING ENGINEERS, annual dinner meeting, New York, N. Y., Jan. 18.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual meeting, New York City, Jan. 20-23.

ENGINEERING INSTITUTE OF CANADA, annual meeting, Montreal, Canada, Jan. 29-30.

AMERICAN CONCRETE INSTITUTE, annual meeting, New York, N. Y., Feb. 23-25.

SOUTH CAROLINA SOCIETY OF ENGINEERS, annual convention, Columbia, S. C., Jan. 7.

NEW JERSEY SOCIETY OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS, annual convention, Paterson, N. J., Jan. 16.

COLORADO SOCIETY OF ENGINEERS, annual meeting, Denver, Colo., Jan. 15-16.

LOUISIANA ENGINEERING SOCIETY, annual meeting, New Orleans, La., Jan. 22-23.

NEW YORK STATE SEWAGE WORKS ASSOCIATION, annual meeting, New York City, Jan. 21-23.

AMERICAN WOOD PRESERVERS ASSOCIATION, annual meeting, New Orleans, La., Jan. 26-28.

NATIONAL PAVING BRICK ASSOCIATION, annual meeting, Detroit, Mich., Jan. 27-29.

CONNECTICUT SOCIETY OF CIVIL ENGINEERS, annual meeting, New Haven, Conn., Feb. 16-17.

SOUTHWEST ROAD SHOW AND SCHOOL, Wichita, Kansas, Feb. 23-26.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES, annual convention, New York, N. Y., Feb. 24-26.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES, annual convention, St. Paul, Minn., Feb. 26-27.

NEW JERSEY SEWAGE WORKS ASSOCIATED, annual meeting, Trenton, N. J., March 11-12.

Nashville Housing Project Redesigned for Lower Cost

A program for the completion of Andrew Jackson Court, PWA's $1,500,000 slum clearance and housing project in Nashville, Tenn., increasing the number of apartments and thus lowering the unit cost, has been authorized by PWA Administrator Ickes following the recommendation of the Housing Division.

Bids were called for twice on the project as originally designed. In each case the bids submitted were considerably above the Housing Division estimate and would have resulted in rents too high to reach the low-income group for whom the development was intended. Accordingly, Administrator Ickes directed that the project be redesigned to effect economies.

As a result of studies undertaken by the Housing Division in cooperation with the Nashville architects who prepared the plans, the new program was worked out. The number of living units in the project will be increased from 276 to 398. The one- and two-story group houses in the original plans have been eliminated, and two-story flats with a larger capacity will be substituted. The foundations for the buildings have already been completed and will be fully utilized under the new plan.

Production of detail plans for the new building has been put under way under the direction of the Nashville Allied Architects. It is expected that work on the plans will be completed shortly after the first of January, and bids will be invited as soon as the plans are ready.

Omaha Railroad Viaduct Act Declared Unconstitutional

The district court at North Platte, Omaha, has declared that the 1935 state law, known as the Viaduct Construction Act, which permitted cities and villages to issue bonds for payment of property damages arising in connection with the construction of federally financed railroad grade crossing elimination projects, is unconstitutional.

The case arose in connection with a $140,000 viaduct over the Union Pacific Railroad tracks in North Platte. At a special election, $82,900 of bonds were voted by the city to pay damages to abutting property owners, and the bonds were issued and sold to an Omaha bank. The city attorney of North Platte has stated that the case will be appealed to a higher court.

An injunction which was requested at the same time, and which would have halted construction on the project, was refused.

New Orleans Receives Bids On Parking Meters

The Commission Council of New Orleans received bids on December 22 for furnishing and installing 2,000 parking meters for use in the business section of the city. The New Orleans installation will be in the largest city and will have the largest number of units of any since parking meters were first introduced in Oklahoma City (*ENR* Dec. 10, 1936, p. 817).

Five bids were received. Identical bids of $58 per meter were received from the Donald F. Duncan Company of Chicago, the Dual Parking Meter Company, of Oklahoma City, the Auto Parker Corporation of Houston, Texas, and the Park Right Corporation of Houston, Texas, bidding through Murray Baker & Frederick Company of New Orleans. The Edward N. Eberling Company, of New Orleans, bidding for Traffic Meters, Inc., bid $58 per meter for the first 500 installation, $54 for the second 500 installation, $46 for the third, $40 for the fourth, and $36 for any further installation.

The area to be metered in New Orleans will extend from the upper side of Howard Avenue to the lower side of Dumaine Street and from the river side of North and South Front Streets to the lake side of North and South Claiborne Avenues, completely covering the business district.

Personals

GEORGE H. SCHNITZER, A. A. STEPHENS and JOHN A. OLSON have formed the Olson Engineering Co. at Cleveland, Ohio.

LEONARD SMITH has been appointed by the Quebec Department of Roads as engineer for the counties of Pontiac and Gatineau.

H. DALE PARK, who has been in the district WPA office at Grand Island, Neb., has been appointed project engineer for Adams, Clay, and Kearney counties.

E. C. LUKE, has been appointed designing engineer of the Western Bridge Company of Vancouver. Mr. Luke was formerly connected with the Pacific Great Eastern Railway of British Columbia.

GEORGE H. DENT, formerly assistant materials engineer for the Maryland state roads commission, has been appointed materials engineer. FRANCIS KEEFER has been named assistant materials engineer.

RICHARD L. KOHNKE, who has been aide to the commissioner of public property for the city of New Orleans, has been appointed assistant engineer for the Louisiana State Board of Engineers. Previous to his connection with the city government, Mr. Kohnke was connected with the Orleans Levee Board.

HUGH CROZIER, assistant supervisor of operations for the second Kentucky district of the WPA, has been appointed supervisor, with headquarters at Danville, to succeed SAM COOKS, who has resigned to go into business. Mr. Crozier was formerly connected with the Kentucky State Highway Department.

F. LYNDEN SMITH has been appointed director of the Illinois department of public works and buildings, succeeding ROBERT KINGERY who resigned that post three months ago. CHARLES P. CASEY, who has been acting director of the department since Mr. Kingery's resignation, will remain as assistant director.

BOGUE VANDERCOOK has been appointed city engineer of Longview, Wash. Mr. Vandercook has recently been connected

with the U. S. Engineers in flood control work. Previously, he was for several years operating superintendent of the Longview, Portland & Northern Railway, and later held various executive and engineering posts with the Long-Bell Lumber Co.

Obituary

BURTON W. FARNHAM, a civil engineer connected for the past 35 years with the New York Central Railroad, died last week in New York City. Mr. Farnham was a graduate in 1891 from Norwich University.

FRED E. BEARANCE, WPA project engineer at Seattle, Wash., died on December 10 at the age of 54. He was at one time an engineer with the General Electric Company and later was engaged in flood control work with the U. S. Engineers.

CHARLES S. BUCKLEY of the Seattle, Wash. city engineering staff, died on December 8. A member of the department since 1919, he was placed in charge of the city's local improvement program in 1928 and later headed the public utilities division.

GEORGE M. DENKINGER died in Oaklawn, Mass., on December 21 at the age of 44. After his graduation in 1917 from the Massachusetts Institute of Technology, Mr. Denkinger was for five years an instructor at M. I. T. in aeronautical engineering. Later he was associated with Starrett & Van Vleck of New York City, and the Haenichen Engineering Co. of Paterson, New Jersey.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards total $43,020,000, representing a short week due to the New Year's holiday. It comprises private work at $17,195,000; public, $25,825,000; federal, $1,425,000; state and municipal, $24,400,000. Corresponding values a week ago are: total, $49,856,000; private, $33,657,000; public, $16,199,000; federal $2,062,000; state and municipal, $14,137,000. This week is the 53rd week for this year, due to the fact that 53 Thursdays fall in 1936. The corresponding week a year ago was recorded as the first week of 1936, with these values: total, $36,736,000; private, $1,521,000; public, $35,215,000; federal, $1,120,000; state and municipal, $34,095,000.

Public, industrial and commercial buildings all show gains this week. The classified subtotals are: industrial buildings, $11,790,000; commercial buildings, $3,798,000; public buildings, $4,653,000; highways, $4,803,000; bridges, $4,745,000; sewerage, $273,000; waterworks, $1,880,000; earthwork, drainage, $810,000; unclassified, $1,268,000.

New capital for this week includes PWA allotments, $1,133,000; state and municipal bonds, $3,675,000, and corporate security issues, $1,080,000.

LARGER PROJECTS FOR THE WEEK

Board and pulp mill, Chesapeake Camp Corp., Franklin Va.	$3,500,000
Pulp and paper mill, 1st unit, Container Corp. of America, Chicago, Ill.	3,000,000
Power plant extension, Hartford Electric Light Co., Hartford, Conn.	3,250,000
Theatre, Rinzler and Frisch, Messerole St. and Graham Ave., Brooklyn, N. Y.	500,000
Asphalt plant, Borough of Queens, George U. Harvey, Pres., Flushing, N. Y.	599,000
Convention hall, Houston Texas	1,031,000
Highways, Illinois	584,000
Highways, Mississippi	999,000
Bridges, Delaware County, Indiana	554,000
Bridge, State Highway, Oklahoma	500,000
Grade Crossing elimination, New York Central Railroad, Little Falls, N. Y.	1,470,000
Pipe line to increase water supply, Everett, Washington	1,257,000
Airport, Albuquerque, New Mexico	850,000
Tunnel, iron and cast steel lining, Midtown Hudson Tunnel, Port of New York Authority, New York City	3,080,000
Tunnel, completion of air ducts, paving, etc., Directors Joint Highway Dist., Oakland, Calif.	545,000
Manufacture, storage, and delivery of cast iron tunnel lining for Queens-Midtown Tunnel, New York Tunnel Authority, New York City	3,356,000

CONTRACTS
(Thousands of Dollars)

	Weekly Average Dec. 1935	Prev. 4 Weeks	Week Dec. 31 1936
Federal Government	$14,735	$5,605	$1,425
State and Municipal	37,038	19,264	24,400
Total public	$51,773	$24,869	$25,825
Total private	7,103	30,951	17,195
Week's total	$58,876	$55,820	$43,020
Cumulative to date: 1935	$4,590,151,000	1936†	$2,386,845,000

† 53 weeks

NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1936	Week Dec. 31	Cumulative†
State and municipal	$3,675	$506,006
PWA non-federal	1,133	165,860
RFC loans	....	26,663
Corporate issues	1,080	251,516
PWA loans, Private	....	—1,665*
Total Non-Federal	$5,888	$948,280
Federal	....	691,237
Federal	....	....
Total new capital	$5,888	$1,639,617
Cumulative to Date 1935	$2,738,034,000	1936† $1,639,617,000

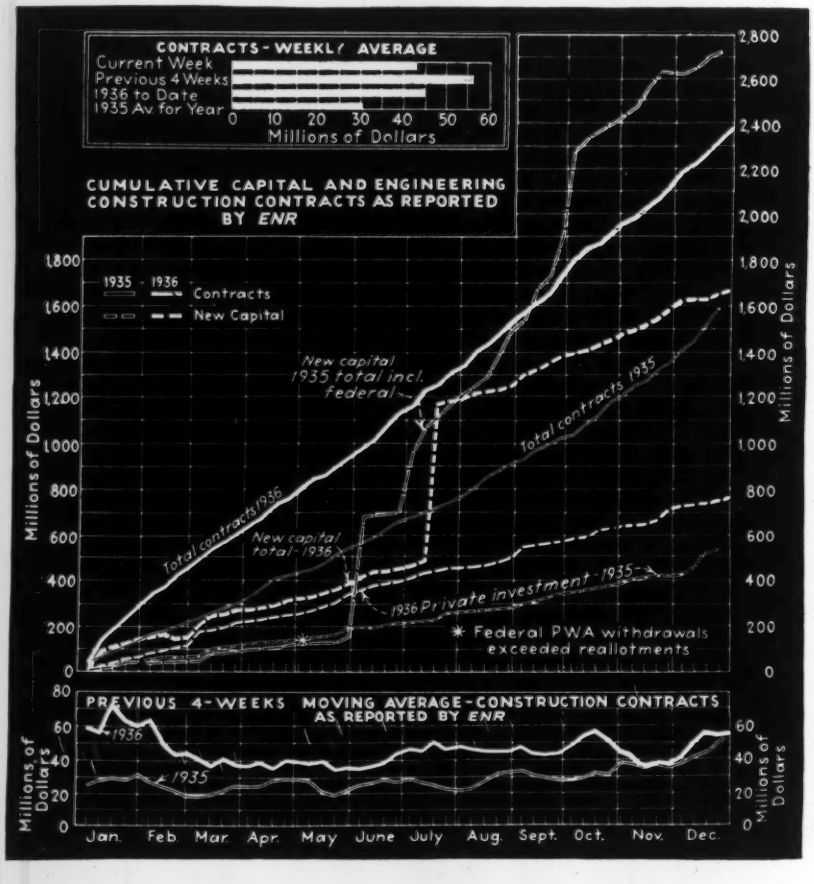
* Bond sales in this classification exceed reallotments during current year.

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities. RFC direct purchase of bonds for "self liquidating" projects, and 25 per cent of WPA construction appropriations.

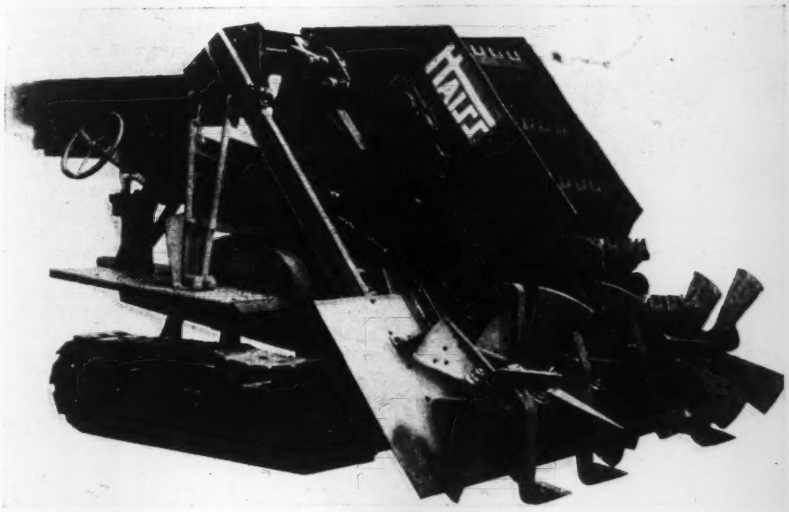
† 53 weeks

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Dec., 1936	220.67	106.07	Nov., 1936	159	70
Nov., 1936	212.70	102.24	Oct., 1936	178	78
Dec., 1935	194.90	93.69	Nov., 1935	171	75
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY ENR
1935 - 1936
Contracts
New Capital
New capital 1935 total incl. federal
Total contracts 1935
Total contracts 1936
New capital total 1936
1936 Private investment 1935
* Federal PWA withdrawals exceeded reallotments
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY ENR
1936
1935
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Construction Equipment and Materials



New Excavator Works In Low Headroom

A new excavator developed by George Haiss Manufacturing Co., of New York City, for low headroom conditions has an overall height of 8 ft. and an 8-ft. extreme width. The design of the machine provides for knocked-down handling in passing the machines down a shaft for tunnel digging. The machine, which will excavate a bench cut up to 48 in. deep, will handle boulders up to 6 in. in diameter; it is protected against large boulders by an overload release clutch.

The digging action centers in the manganese steel revolving picks and paddles carried on the extended tailshaft. This digging-feeding device will handle muck, clay, gravel, and soft shale and, it is said, pass 1½ to 1¾ cu. yd. of material per min. to the bucket elevator. The elevator discharges onto a short belt conveyor with a 5-ft. reach beyond the chassis frame. The machine is self-propelled on crawlers, and when digging it is crowded into the work by a slow-speed worm drive to exert a continuous positive pressure.

The digging level can be raised or lowered in relation to the creeper tread while the machine is operating.

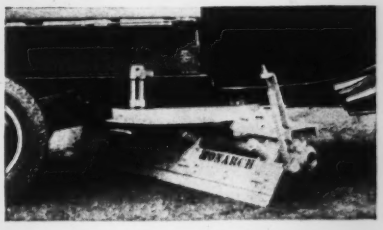
Manhole Cushion Reduces Noise

In order to reduce the noise of loose manhole covers and prevent the covers from being dislodged or thrown off, Trohn's Supplies, Inc., of Mamaroneck, N. Y., have developed Tapax, an adhesive manhole cushion.

Tapax is a gasket tape, furnished in 200 ft. reels, made of asbestos incorporated with a network of wire and thoroughly impregnated with a weather-proof adhesive which fastens it to the manhole frame. It is said to conform to the irregularities of the frame and the cover, furnishing a full bearing surface at all times. It is said also completely to eliminate noise of loose manhole covers.

TRUCK MOUNTED SCRAPER

THE MONARCH HYDRAULIC ROAD SCRAPER, built by the Monarch Road Machinery Co., of Grand Rapids, Mich., is designed to be fastened to the frame of an ordinary truck. The hydraulic controls will force the scraper to the road with a pressure up to 1500 lb., where it is held firmly in the plane of the truck wheels, or will bring it up 8 in. off the road so that the truck may be used for other purposes. Flexibility is provided by horizontally mounted springs.



Radio Device Locates Underground Pipes

A new device developed by the Fisher Research Laboratory Sales Co. of New York City, the M-scope, is said quickly to locate underground pipes, cables, or other metal objects and measure their depth. No electrical contact with the object being sought is required except when tracing a single member of a compact group of pipes or cables.

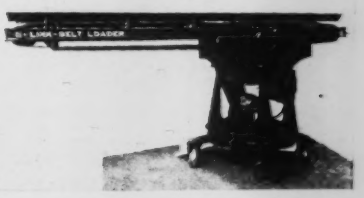
The device consists essentially of a radio transmitter and a receiver. In using the M-scope to locate a buried pipe or cable line, the two units are assembled together. The operator switches on the transmitter, puts on ear phones connected with the receiver, and carries both units in the direction of the line. As he approaches the line, the sound heard in the phones gradually increases and a needle on an indicator swings forward. The spot where the signals reach a maximum is marked, and the operator then continues onward along the same line until the signals become weak. He then retraces his steps until both signals are maximum once more. The point halfway between the two maximum points is over the center of the pipe, and the distance between the two maximum points is twice the depth of the pipe.

To trace a pipe line, the transmitter is set on the ground directly above it, and the operator, carrying the receiver, follows the path along which sustained signals are received. Sudden increases in the signals indicate additional metal, such as a valve or junction. Branches are located by placing the transmitter above the main line and carrying the receiver parallel to this line.

Most of the parts of the M-scope, it is said, are standard radio equipment which can be procured or repaired anywhere. The complete instrument in a carrying case weighs about 22 pounds.

NEW CAR LOADER

THE LINK-BELT CO., of Philadelphia, has developed a new type of inexpensive box car loader for handling bulk materials which is said to create a minimum of dust and degradation of the product. An anti-friction belt conveyor which constitutes the



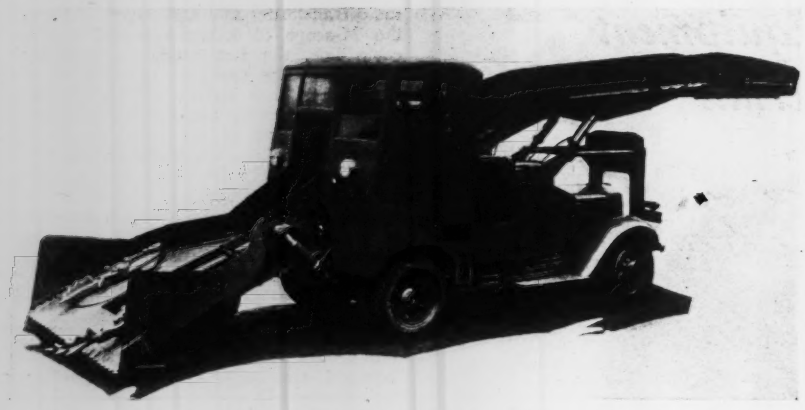
loading element of the machine, is supported on a horizontal boom which is so arranged that it can be racked back and forth or rotated by hand on its truck. The conveyor is operated at a comparatively low speed and has a discharge height of 5 ft.

Spiral Feed Snow Loader

The Model 38 snow loader manufactured by the Barber-Greene Co., of Aurora, Ill., has a new spiral feed which is said to give a uniform feed from the full working face, increasing the capacity under tough conditions. The drive on the spiral is positive up to the capacity of the automatic overload release. The release, which has an adjustable tension, slips when an obstacle is struck and immediately resets itself.

The new model has a traveling speed of two or three miles per hour and a full crawler mounting. The machine is rated at a capacity of 10 yd. of snow a minute.

A side discharge shuttle conveyor is furnished as an optional extra.



JOY snow loader.

Articulated Conveyor In New Snow Loader

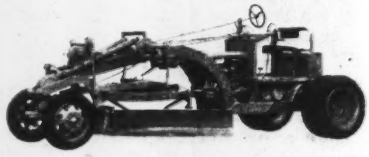
The NY-36 Joy snow loader, which is manufactured by the Joy Mfg. Co., of Franklin, Pa., is designed to load snow and ice at a rate of 10 to 20 cu.yd. per minute. Its travel speed while loading varies from a standstill to 2½ miles per hour, and its maximum speed is about 25 miles per hour.

The loading mechanism consists of a gathering head and an elevating and discharging flight conveyor. It is driven at a governed speed varying according to the loading requirements from a standard direct connected gasoline motor. The loading mechanism is mounted on a standard truck chassis powered in the conventional manner by a separate motor.

An articulated section and a universal chain permits the conveyor to be swung laterally to either side of the machine for discharge into trucks. It also permits vertical adjustment of the discharge conveyor independent of the position of the gathering head. Adjustments of the position of the gathering head and conveyor are accomplished by hydraulic controls mounted in the cab.

Light Motor Grader

J. D. Adams Co., of Indianapolis, Ind., have brought out a light-motor grader powered by an International tractor with a 22½ hp. engine. The machine is said to be especially adapted to use on unimproved streets and township roads and for work in parks and airports.



Unusual working ability in proportion to the horsepower is said to be provided by the high gear ratio. Working speeds of 2, 3, 5, and 6 miles per hour are available and a travel speed of 7.5 miles per hour may be obtained when the machine is traveling empty.

Standard equipment includes a 9-ft. blade. The approximate weight of the machine is 8300 lb.

Recent Publications

✦ The BROWN INSTRUMENT CO., of Philadelphia, Pa., has published a new catalog of *Thermometers and Pressure Gages.*

✦ A very full illustrated catalog of *Materials Handling Machinery* in 110 pages comes from the GIFFORD-WOOD CO., of Hudson, N. Y.

✦ The *Cameron Coupled Pump* is described in a 15-page pamphlet of the INGERSOLL-RAND CO., of New York City. The booklet includes dimension and capacity tables.

✦ In a handsome booklet, *Cutting Costs*, the LONE STAR CEMENT CO., of New York City describes the economies to be effected in the construction of concrete frame buildings by the use of Incor high early strength cement.

✦ *Self-priming Centrifugal Pumps* are described in a new bulletin of the NOVO ENGINE CO., Lansing, Mich.

✦ *Bulletin* 1478 describes the low-head horizontal screen and *Bulletin* 1479 the centrifugal vibrating screen manufactured by the ALLIS-CHALMERS MANUFACTURING CO., of Milwaukee, Wis.

✦ *Wiring* describes the electrical installation features of the cellular steel floor manufactured by the H. H. ROBINSON CO., of Pittsburgh, Pa. A catalog of standard electrical fittings is included.

✦ *Worthington Aids for the Contractor* describes the variety of equipment, ranging from drills to forging furnaces, manufactured for the use of the contractor by the WORTHINGTON PUMP & MACHINERY CORP., of Harrison, N. J.

✦ V-belt drives are described in *Data Book No. 782*, published by the ROCKWOOD MANUFACTURING CO., of Indianapolis, Ind.

✦ A brief catalog of concrete vibrators has just been issued by the CHICAGO PNEUMATIC TOOL CO., of New York City.

✦ *Diesel Engines*, published by INGERSOLL-RAND CO., of New York City, describes in considerable detail the features of their type F engine.

✦ The advantages of *Manganese Steel Dredge Cutter Heads* are discussed in a pamphlet of the AMERICAN MANGANESE STEEL CO., of Chicago Heights, Ill.

✦ The features of and design data for the Chicago combination aerator-clarifier, manufactured by the CHICAGO PUMP CO., of Chicago, Ill., are presented in *Bulletin 128-K.*

✦ A little illustrated folder issued by the LEWIS-SHEPARD CO., of Watertown, Mass. catalogs their hand and electric powered *Portable Cranes.*

✦ LEEDS & NORTHRUP CO., of Philadelphia, describe their *Power Plant Measuring Instruments* in a new broadside.

✦ The DOUGLAS FIR PLYWOOD ASSOCIATION, of Tacoma, Wash., has put out two new publications. A pamphlet entitled *The Engineered Wood Product* gives a general description of the material, and *File No. 19-E-5* presents the charts resulting from a series of strength and deflection tests on ply-wood members.

✦ The CALIFORNIA RED WOOD ASSOCIATION, of San Francisco, has issued a loose-leaf set of *Standard Patterns* for red wood lumber and *Standard Specifications for Grading.*

✦ *In The New Arc Welding Technique*, the LINCOLN ELECTRIC CO., of Cleveland, describes the features of the new shield-arc SAE welder.

New Process Developed for Steel Surface Protection

The Synhibit process for protection against rust on steel surfaces, which is being marketed by license by Thompson & Co., Pittsburgh, Pa., is said to give protection to the surfaces more lasting than that provided by ordinary painting methods.

The method is based upon the belief that the mill scale which accumulates on the steel is not in itself harmful unless there is active rust beneath it. In the application of the process, the loose scale and rust is removed from the steel with a wire brush. It is not necessary to remove all the rust or to polish the surface. Synhibit inhibitor is then applied to the surface. This is a liquid containing, in addition to solvents and dispersing agents, both phosphoric acid and a chromium compound. It is said to possess the property of working under the tight scale and removing or rendering passive all rust which is present. At the same time it dissolves and disperses any grease or oil which may be on the surface and deposits a complex iron chromium phosphate to which paints adhere with great tenacity.

The inhibitor treatment is followed by the application of Synhibit Primer, a zinc chromate, iron oxide, synthetic vehicle paint. This paint is said to be highly resistant to water, acids, alkalis, mill fumes, and brine drippings.

As a final step, Synhibit Aluminum finish coat is applied or graphite base Synhibit paint may be used instead.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Ark., Paris—City plans constructing earth dam for reservoir site. Applied for $200,000 P.W.A. loan and grant.

California—Public Utilities Comn., Engineering Dpt., 425 Mason St., San Francisco, made preliminary surveys for 36 in. watermain connecting with Hetch Hetchy Water System of City and County of San Francisco, from Five Points in San Mateo Co. to Los Altos in Santa Clara Co. City and County of San Francisco proposes to sell water communities in that area with water at "minimum cost."

★**Calif., Ventura**—City defeated $1,400,000 bonds, for construction of Coyote Creek Dam, Diversian Canal and water treatment plant. Noted Dec. 11,. C.D.—Oct. 22, E.N.-R.

Ill., Blue Island—City has postponed bids scheduled to be opened Dec. 28, for waterworks improvements. Contracts A, B, and C. Bids to be advertised later. Noted Dec. 15, C.D.—Dec. 17, E.N.-R.

★**La., Baton Rouge**—North Baton Rouge Water Works Dist. 1, made application to P.W.A. for $281,321 grant to finance construction of waterworks system in North Baton Rouge. Total est. $625,158. E. G. Blakewood, Baton Rouge, engr.

La., New Orleans—Sewerage & Water Bd. making plans 1 story, 50x72 ft. water pumping plant building, concrete on pile foundation at purification plant; two 50 m. g. p. d. pumps; two 2,250 h.p. motors and two 800 h.p. motor switchboards and auxiliary equipment. P.W.A. project.

Mass, Amesbury—Town. A. M. Grant, clk., plans c.i. watermains in Southampton, Whitehall and Haverhill Rds. $20,000 appropriation for materials voted at Town meeting. W.P.A. project.

Minn., Holdingford—Village. V. E. Schneider, clk., plans constructing watermains and sewer extensions, storm sewers and disposal plant. $50,000. Applied for W.P.A. funds.

N. Y., Newark—City. Municipal Bd., plans constructing retention well at new water supply system now being built. Applied for W.P.A. funds. **Maturity soon.** G. Fremouw, c/o owner, engr.

N. Y., Syracuse—City of Syracuse Water Bureau, City Hall, plans constructing c.i. conduit from intake in Skaneateles Lake reservoir for city of Syracuse, to point near village of Skaneateles to connect with present 36 in. mains, to be 5 ft. underground. To exceed $23,000. W. Cronin, city engr.

N. Y., Syracuse—City of Syracuse Water Bureau, City Hall, plans relocating and straightening large water conduits in Cammillus, near here. To exceed $12,000. Will apply for W.P.A. funds. W. W. Cronin, city engr.

N. Y., Yonkers—See "Sewerage and Waste Disposal."

Okla., Lawton—City made preliminary plans constructing impounding reservoir water supply. $175,000. W. B. Hendricks, Lawton, engr.

Pa., Erie—City. Bd. Water Comrs., plans constructing additional reservoir unit at upper Cherry St. booster station. To exceed $1,000. **Maturity soon.** A. N. Aitkin, city engr.

S. C., Fairfax—Town Council rejected bids Dec. 16, waterworks system. P.W.A. Docket SC 1130-1 D. Bond issue held on same day, failed to carry. Ryan Eng. Co., 39, 41 and 43 Arcade Bldg., Columbia, engrs. Noted Dec. 7, C.D.—Dec. 10, E.N.-R.

S. D., Madison—City, grant and loan accepted for waterworks improvements. $27,273. P.W.A. project. J. W. Embern, city engr. Noted Apr. 1, C.D.—Apr. 9, E.N.-R.

Tex., Annona—City, c/o E. P. Gaines, mayor, plans complete and soon takes bids waterworks improvements, incl. water supply line, pump house and filter plant. $28,000. Municipal Eng. Co., 2906 Maple Ave., Dallas, engrs.

Tex., Decatur—City, c/o A. Ingram, mayor, plans complete and soon takes bids waterworks improvements, incl. pumping equipment, pump house, distribution system, extensions and revamp entire system. $52,000. F. J. Von Zuben, 1014 Electric Bldg., Fort Worth, engr.

Wyo., Wheatland—City, c/o City clerk, preliminary plans enlarging City Reservoir 1 by raising outlet dyke 8 ft. and widening all dykes at base. $25,000. P.W.A. project.

Que., Lachute—Village soon take bids waterworks improvements. $80,000. S. Ouimet, Lachute, engr.

BIDS ASKED

Ariz., Globe—See "Contracts Awarded."

Kan., Eudora—Jan. 5, by City, 70 ft. gravel wall well. P.W.A. project. Take bids later on distribution system, incl. about 33,000 ft. c. i. pipe, 50,000 gal. steel tank on tower and iron removal plant. Sheokley Eng. Co., 800 Graphic Arts Bldg., Kansas City, Mo., engrs.

Md., Baltimore—Jan. 20, at office of City Register, City Hall, furnishing, constructing Gunpowder Falls (Loch Raven Dam) Montebello Filters Water Tunnel. H. W. Jackson, pres. Bd. Awards. L. Small, water engr.; adv. E.N.-R. Dec. 31

Mich., Benton Harbor—Jan. 5, by H. H. Crow, city mgr., furnishing, erecting complete, incl. concrete foundations, 600,000 gal. elevated water storage tank, with entire contents of tank not less than 100 ft. above top of foundations, steel tower. P.W.A. project. Ayres, Lewis, Norris & May, 506 Wolverine Bldg., Ann Arbor, engrs. Noted Oct. 30, C.D.—Nov. 5, E.N.-R.

N. Y., New York—Jan. 12, by Bd. Water Supply, 346 Bway., G. J. Gillespie, pres., constructing shafts for Delaware Aqueduct, Contr. 332, Shafts 2, 2A and 3, Rondout West Branch tunnel in Wawarsing and Gardiner, Ulster Co.; Contr. 336, Shafts 17 Uptake and 17 Downtake of West Branch-Kensico tunnel and Shafts 18 uptake and 18 Downtake, 19 Uptake and 19 Downtake, 20, 21, 22 and 23, Kensico-Hill View Tunnel, North Castle, Mount Pleasant, Greenburgh and Yonkers, Westchester Co.

N. D., Jamestown—Jan. 9, by A. R. Thompson, city aud., constructing water softening plant. $98,000. P.W.A. project. G. R. Horton, city engr. E. L. Lium, Grand Forks, consult. engr. Noted Nov. 16, C.D.—Nov. 19, E.N.-R.

O., Garfield Heights—Jan. 16, by J. A. Petsche, city engr., 5561 Tunney Rd., improvements to city's water distribution system. $41,991. P.W.A. project. Noted Nov. 5, C.D.

S. D., Jamestown—Jan. 9, by City, constructing water softening plant, being aeration chamber, mixing tanks, carbonation chamber, settling tanks, filters and clear well. $87,272. P.W.A. project. G. R. Horton, engr.

S. D., Lennox—Jan. 8, by City, constructing waterworks. $20,909. P.W.A. project. Perkins & McWayne, 322 Paulton Bldg., Sioux Falls, engrs. Noted Nov. 6, C.D.—Nov. 12, E.N.-R.

Utah, Huntington — See "Contracts Awarded."

Wis., Milwaukee—Jan. 12, by Dpt. P. Wks., constructing pneumatic conveying equipment in water purification plant. P.W.A project. R. E. Stoelting, comr.

CONTRACTS AWARDED

Ariz., Globe—City, replacing worn wrought iron watermains with new c. i. mains in various sections city, incl. approximately 4 mi. excavation, laying 23,000 ft. 2- to 8-in pipe and refilling excavation. **W.P.A.** labor, $61,666. Work begun Dec. 15. Noted Sept. 29, C.D.—Oct. 1, E.N.-R.

Calif., Beverly Hills—City Clerk, improvements to waterworks, incl. constructing 18,000 lin. ft. 6- to 12-in. c. i. pipe line, to F. W. Weber, 8442 California Ave., South Gate, $44,292; constructing steel tanks, to Chicago Bridge & Iron Wks., 608 South Hill St., Los Angeles, $35,665. Est. $93,000. **P.W.A.** Bids Dec. 8, awarded Dec. 16. Noted Nov. 24, C.D.—Dec. 3, E.N.-R.

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., drilling, developing, testing and installing 14 in. casing in water well in Kagel Canyon, near San Fernando, to Newton Palm, 185 North Chestnut Ave., Ventura, $3,120. Bids Dec. 1. Noted Nov. 12, C.D.—Nov. 19, E.N. R.

Calif., Los Angeles—Metropolitan Water Dist., F. E. Weymouth, engr., 306 West 3rd St., constructing water supply, fire protection and sanitary sewerage systems for Gene and Hayfield Pumping Plants, Schedule 1, Gene plant, 13,700 lb. 8 in., 85,000 lb. 6 in., 3,900 lb. 4 in. and 50,000 lb. 3 in. c. i. pipe, 1,200 lin. ft. 1 in. galvanized steel pipe, 10 hydrants 9,400 ft. vitr. clay sewer pipe, drain tile, septic tank, valves, etc., to E. C. Nickel, 912 Micheltorena St., $28,937; Schedule 2, Hayfield plant, 11,000 lb. 6 in., 7,000 lb. 4 in. and 36,000 lb. 3 in. c. i. pipe, 5 hydrants, water tank, valves, 3,400 lin. ft. vitr. clay sewer pipe and drain tile, septic tank, etc., to A. L. Gabrielson, 3316 Comer St., Riverside, $9,987, both foregoing. Spec. 179. Bids Dec. 14, awarded Dec. 18. Noted Nov. 24, C.D.—Dec. 3, E.N.-R.

†**Calif., Sacramento**—Con. Q.M., Old Post Office Bldg., Sacramento, drilling wells at Air Corps Supply Depot, near North Sacramento, to F. H. Eaton, North Cleveland and Park Ave., Woodland, Calif., $4,639. Bids Dec. 1. Noted Nov. 20.

Ia., Calamus—City, constructing steel tank for waterworks, to Des Moines Steel Co., 421 Southwest 4th St., Des Moines, $6,787*** well, pumphouse and pump to Charles Nolan Co., Cedar Rapids, $3,021***pipeline to D. Christensen, Cedar Rapids, $14,361*** fire hose, to Christensen, c/o Colson Co., Calamus, $650***meters, to National Meter Co., 1455 West Congress St., Chicago, Ill., $360. Grand total $25,179. **P.W.A.** Bids Dec. 17. Noted Dec. 14, C.D.

Kan., Mt. Hope—City, constructing waterworks system, incl. 21,600 ft. 2- to 6-in. c. i. pipe, 50,000 gal. steel tanks, one 70 ft. deep well, one 150 gal. pump, to Asplund Constr. Co., Enid, Okla., $35,390. Bids Dec. 11. Noted Dec. 10, C.D.

La., Sunset—City, constructing deep well pump tower and tank, complete system of c. i. water pipe for domestic and fire service with accessories, to Litrell Constr. Co., Opelousas, $24,679. Bids Dec. 15. Noted Dec. 7, C.D.

Mass., Lawrence—Wood Worsted Mills, 1 South Union St., A. Ware, engr. for owners, constructing filter plant in present building, to C. S. Patten, 68 Essex St., Melrose. Est. exceeds $25,000.

Mo., Grandview—Jackson County Water Dist., Kansas City, constructing tank and tower in connection with water distribution system, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $23,950. **P.W.A.** Bids Dec. 14. Noted Nov. 16, C.D.—Nov. 19, E.N.-R.

N. C., Cornelius—Town, municipal waterworks, to Boyd & Goforth, Inc., 617 North Smith St., Charlotte, $27,765. Est. $38,181. **P.W.A.** Bids Dec. 15. Noted Apr. 16, C.D.—Apr. 23, E.N.-R.

S. D., Rapid City—City furnishing, installing 13,440 lin. ft. 18 in. c. i. water supply line, to Northwestern Eng. Co., Rapid City, $75,129. **P.W.A. project.** Bids Dec. 14.

Utah, Huntington—City, replacing wood pipe with steel pipe and extensions to present distribution system, day labor as **W.P.A.** project. W.P.A. furnishes $9,770 for labor and materials and city furnishes $5,985 for purchasing pipe and other equipment.

Vt., Swanton—Village, L. E. Jordan, supt., waterworks system, separate contracts awarded; 14,000 ft. c. i. pipe, to U. S. Pipe & Fdry. Co., Webb-Crawford Bldg., Birmingham, Ala. Noted Dec. 3 C.D.—Dec. 10, E.N.-R.

★**Wash., Everett**—City Council, constructing steel pipe line inl. 38,613 ft. 52 in. and 62,838 ft. 48 in. mains paralleling existing main from Lake Champlain in Cascade Mountains, increasing city's water supply by

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E.N.-R., Engineering News-Record
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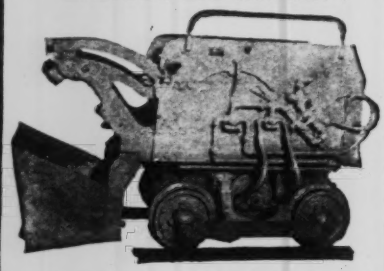

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Waterworks (Continued)

50 m.g.p.d., to Western Pipe & Steel Co., 444 Market St., San Francisco, Calif., $1,257,366. **Maturity after Jan. 1.** Bids Dec. 16, awarded Dec. 16. Noted Nov. 6, C.D.

Ont., Bolton—City Council, standpipe in conection with new waterworks system, to Toronto Iron Wks., Eastern Ave., Toronto, $5,125***c.i. pipe and castings, to National Iron Corp., Cherry St., Toronto, $9,708*** laying 2 mi. 6 in. mains, to Grant Contag, Co., 47 Wellington St. East, $7,268. Grand total $22,101. Pumphouse, to W. Black, Bolton.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Colo., Glenwood Springs—City making plans sewage disposal plant. $30,909. P.W.A. project. K. von Rosenberg, Glenwood Springs, engr. Noted Nov. 6, C.D.—Nov. 12, E.N.-R., under "Glenwood."

★**Ia., Des Moines**—City, R. Hansen, clk., plans sewage disposal plant. $1,250,000. Will probably vote on $358,000 bond issue. J. M. Tippee, city engr. Applied for P.W.A. funds.

★**Mich., Lansing**—City plans brick, steel, concrete incinerator plant. $800,000. K. and L. Black, 805 Capitol Savings and Loan Bldg., Lansing, archts. Shoecraft, Drury & McNamee, Ann Arbor, engrs.

Minn., Holdingford—See "Waterworks."

Minn., Moorhead—City plans 1 mi. sanitary sewer in 4th Ave. N. between 12th and 15th Sts.; 13th, 14th and 15th Aves. between 2nd and 6th Ave. N., $31,500. W.P.A. project. A. A. Hawkinson, acting city engr.

Mo., LeMay—LeMay Ferry Sanitary Dist., c/o P. F. Maes, et al., soon takes bids constructing complete sanitary sewerage system for district bounded by Mississippi River, Union Rd., Jefferson Barracks Rd. and Mount Olive Rd. in southeastern section of St. Louis County. $170,000 bonds voted. Applied for $139,050 P.W.A. grant. Total cost $309,050.

N. J., Jamesburg — Mayor and Council abandoned proposition to build sewer and disposal plant for boro. Note. Oct. 30, C.D. —Nov. 5, E.N.-R.

New York—C. A. Holmquist, director Division of Sanitation, State Dpt. Health, State Bldg., Albany, recommended immediate construction at Champlain, a complete sewerage system***Chatham, constructing complete sewerage system***Cheektowaga, constructing additions and improvements for sewage treatment plant, in District 5, incl. final settling tank***Elmira Heights, constructing complete sewerage system***Hudson, constructing sewage treatment plant***Horseheads, constructing complete sewerage system*** McGraw, constructing sewerage system*** Pawling, constructing complete sewerage system***Sherburne, Village, constructing complete sewerage system. Engineers not appointed. Owners may apply for W.P.A. or P.W.A. funds.

N. Y., Buffalo — City plans storm water sewers in East Ferry St. to drain into trunk lines in Michigan and Jefferson Sts. $123,740. P.W.A. grant $99,000 applied for.

N. Y., Cortland — City plans sewage disposal plant. To exceed $25,000. Engineer not appointed. Owner will apply for P.W.A. or W.P.A. funds. C. A. Holmquist, dir. Div. Sanitation, New York State Dpt. Health, State Bldg., Albany, recommended immediate construction. Noted Aug. 22, 1935, C.D.—Aug. 29, 1935, E.N.-R.

N. Y., Elmira — City plans constructing sewer lines to supplement those recently completed with P.W.A. aid. **Maturity soon.** To exceed $25,000. P.W.A. application withdrawn. Will probably finance by private bond issue. Remington & Goff, 509 Cooper St., Camden, N. J., engrs.

★**N. Y., Flushing** — G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., Long Island City, plans 2 mi. sanitary trunk sewer to improve Flushing Bay. $1,056,000.

N. Y., Greece—Village bids in January, constructing sewage disposal plant. $200,000.

N. Y., Syracuse — Bd. Supervs. Onondaga Co., Court House, plans sanitary sewers in Eastwood Section, to drain into new Ley Creek Sewer, near here. $110,000. Will apply for W.P.A. funds. **Maturity soon.**

N. Y., Yonkers — City plans constructing sanitary and storm sewers in Runyan Heights Section. To exceed $23,000. May apply for P.W.A. grant C. Sheridan, city engr.

N. Y., Yonkers—City, J. F. Loehr, mayor, City Hall, plans installing sewers, lights and watermains in the proposed underpass at Dunwoodie. $29,300. Plans being prepared for approval of Public Service Comn., Albany.

Pa., Wheatland—Village, bids in about 60 days, constructing sanitary sewerage system for Wheatland, near Sharon. $214,000. Federal Aid furnished in amount of $157,[illegible] W.P.A. project.

S. D., Faulton—City, sewage disposal plant project has been rejected and P.W.A. will rescind it. $18,182. P.W.A. project. Buell Winter Eng. Co., Sioux City, Ia., engrs. Noted Dec. 9, C.D.—Dec. 17, E.N.-R.

Utah, Salt Lake City—City, c/o City Clerk, plans municipal garbage incinerator. $80,0[illegible] W. D. Beers, city engr.

BIDS ASKED

Ariz., Wickenburg—Jan. 4, by H. P. Sullivan, mayor, constructing sewerage works [illegible] town. $42,000. P.W.A. project. Noted Oct. [illegible] C.D.—Nov. 5, E.N.-R.

Calif., Newport Beach—Jan. 11 (tentative date), by City Clerk, complete sewerage system, incl. 1,870 ft. 30 in. vitr. clay pipe extra strength, 5,130 ft. 30 in. standard, 29,480 ft. 8- to 27-in. vitr. clay pipe, 5,490 ft. 8- to 14-in. c.i. pipe. $338,000. P.W.A. project. R. [illegible] Patterson, City Hall, engr. Bids Dec. 14 rejected.

Conn., Middletown—Jan. 4, by S. G. Cannon, supt. P. Wks., at City Chambers, Municipal Bldg., construction of garbage and refuse incinerator. P.W.A. Project 1233 F. Contr. B-4. W. F. Bowe, 110 William St., New York, consult. engr.; adv. E.N.-R. Dec. 31.

Ill., Chicago—Jan. 14 (extended date), by J. J. Sullivan, clk. Sanitary District of Chicago, 910 South Michigan Ave., constructing Calumet Intercepting Sewer Contr. 17B, incl. rein.-con., brick, pumping station, manhole west of pump and blower house, discharge pipe lines from pumping station to present surge chamber, furnishing, erecting, installing 3 sewage pumps, 1 sump pump, with accessories, bar screen, and cleaning device, piping, valves, pumps, etc.; adv. E.N.-R. Dec. 31. Noted Dec. 14, C.D.—Dec. 17, E.N.-R.

Mich., Lansing—Jan. 11, by Bertha Ray, city clk., constructing 1 story, brick, steel, tile, concrete pumping station, Roseneath Ave., Manufacturers' Railroad and Lansing Ave. site; furnishing and erecting four vertical shaft motor driven centrifugal sewage pumping units with motor starters and accessories, incl. one 2,800 gpm 33 ft. head, one 4,200 gpm 34 ft. head, one 4,900 gpm 35 ft. head and one 5,600 gpm 35½ ft. head pumping units for Lansing Ave. Pumping Station. P.W.A. project. Shoecraft, Drury & McNamee, Ann Arbor, engrs.

Neb., Curtis—Jan. 5, by City, constructing sewers and paving. $141,818. H. S. Nixon, Omaha, Neb., engr. Noted Nov. 6, C.D.—Nov. 12, E.N.-R.

Neb., Lincoln—Jan. 5, by Lancaster County Sanitary District 1, Lincoln, constructing sewage pumping station and force main. Total $110,000. Scott & Scott, Lincoln, engrs.

N. J., Florence—Jan. 7, by Township Committee, Town Hall, Contr. 1, constructing sanitary sewerage system, Contr. 2, sewage pumping station and sewage treatment plant adv. E.N.-R. Dec. 31. C. B. Green, twp. clk. Noted Oct. 22, C.D.—Oct. 29, E.N.-R.

N. Y., Rochester—Jan. 18 (extended date), by J. G. Schreiner, city purch. agt., City Hall, constructing 58x66x99 ft. steel, frame concrete building, 2 furnaces, 2 boilers, 420 hp. each; 250 ft. high chimney and appurtenances, $335,960; adv. E.N.-R. Dec. 31. Noted Dec. 14, C.D.—Dec. 17, E.N.-R.

O., St. Clairsville—City bids about Jan. 15, constructing sanitary sewerage system, north side of town, disposal plants, booster pumps. $100,000. Part of $200,000 project. W.P.A. project. Jennings Lawrence Eng. Co., 12 North 3rd St., Columbus, engrs. Noted Nov. 27, C.D.—Dec. 3, E.N.-R.

Pa., Clarks Summit—Jan. 6 (extended date), by President Borough Council of Clarks Summit, sanitary sewers and sewage treatment plant, Remington & Goff, 509 Cooper St., Camden, N. J., engrs. Noted Nov. 23, C.D.—Nov. 26, E.N.-R.

Ont., Islington—See "Contracts Awarded".

LOW BIDDERS

★**Colo., Denver**—Manager of Improvements & Parks, City and County Bldg., Dec. 17, constructing Williams Fork Tunnel in connection with the sewage treatment works system for City and Denver Co., from Broderick & Gordon, 1900-31st St., Denver, Alternate **(A)** $555,440; **(B)** $556,367; **(C)** $554,147. Noted Dec. 8, C.D.—Dec. 10, E.N.-R.

Ont., Islington—Etobicoke Twp., constructing sewer, Kingsway-Lambton Mills District System, day labor, $200,000. W. H. Walker, Islington, engr., will purchase materials. Noted Jan. 29, C.D.—Feb. 6, E.N.-R.

CONTRACTS AWARDED

N. Y., Elmira—Dpt. Correction, State Bldg., Albany, sewers and water lines at Elmira Reformatory, to Bruno Trimpoli, 251 Altamont Ave., Schenectady, $52,978.

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†*Federal Government*

Sewerage, etc. (Continued)

Tenn., Collierville—At office of R. L. Strong, mayor, sewerage system, to G. M. Ferris, Athens, $62,834. **P.W.A.** Bids Dec. 9. Noted Dec. 4, C.D.—Nov. 19, E.N.-R.

Tex., Hempstead—City, c/o S. C. Walker, mayor, pipe, disposal plant, manholes, wyes collecting system, sanitary sewers, to E. L. Dalton Constr. Co., Dallas Bank & Trust Bldg., Dallas, $37,712. **P.W.A.** Bids Dec. 10. Noted Nov. 25, C.D.—Dec. 3, E.N.-R.

Wis., Milwaukee—Sewerage Comn., pump pit for sludge pumping control station, to Pitt Constr. Co., Gulf Bldg., Pittsburgh, Pa., $14,936***electrical work and control equipment, to Staff Electric Co., 1659 North Jackson St., $587 and $6,490 respectively***metering equipment, to Simplex Valve & Meter Co., 107 East Knapp St., Milwaukee, $4,340 ***sludge pumps, to Allis-Chalmers Mfg. Co., 1126 South 70th St., West Allis, $4,390. Grand total $30,740. **P.W.A.** Bids Dec. 10, awarded Dec. 17.

Wis., South Milwaukee—City, constructing sewage plant, to Hunzinger Constr. Co., 1827 North 3rd St., Milwaukee, $88,242. **P.W.A.** Bids Dec. 10. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

Man., Winnipeg—Municipality, steel tanks in connection with sewage disposal plant, to Manitoba Bridge & Iron Wks., Winnipeg, $7,086***special sluice gates, to Vulcan Iron Wks., Winnipeg, $5,220***traveling electric crane, to Kipp Kelly Ltd., $2,862. Grand total $15,168. Bids Nov. 9. Noted Oct. 23, C.D.—Oct. 29, E.N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Ia., Council Bluffs—State Hy. Comn., Ames, plans constructing viaduct over Northwestern R.R. Co., and Illinois Central R.R. Co. tracks, on Bway. To exceed $75,000. F. R. White, Ames, state hy. engr.

Mississippi—Mississippi State Hy. Comn., Jackson, making plans 330 lin. ft. incl. 250 ft. cantilever girder span bridge over Chickasawhay River, Wayne Co.; 4,700 ft. bridge over Big Black River, consisting of 120 ft. truss span and approaches, I-beam spans on creosoted timber bents, or I-beams on steel pile bents. Claiborne and Warren Counties. R. A. Harris, Jackson, engr.

Neb., Ashland—State Hy. Dpt., Lincoln, repairing bridge over Salt Creek, incl. replacing 2 spans with 1 larger span, timber pilings to be replaced by steel pilings. A. C. Tilley, Lincoln, state engr.

New York—Dpt. P. Wks., Albany, rejected bids Dec. 18, constructing grade separations in Queens Co. Will readvertise. Noted Nov. 23, C.D.—Nov. 26, E.N.-R.

North Carolina—State Hy. and P. Wks. Comn., Raleigh, rejected bids Dec. 15, overhead crossing over Southern R.R. in Kings Mountain, P. 8212, Cleveland Co. $25,000-$50,000. Noted Oct. 21, C.D.

Texas—State Hy. Comn., H. Hines, chn., Austin, soon takes bids Davidson Creek Bridge and approaches, Hy. 36, F.A.P. 627-A, Caldwell, Burleson Co.

Texas—State Hy. Comm., H. Hines, chn., Austin, soon takes bids constructing North Paluxy River bridge, approaches and small drainage structures, Hy. 66, F.A.P. 813-D, Stephenville, Erath Co.

Texas—State Hy. Comn., H. Hines, chn., Austin, making plans and soon takes bids steel, concrete bridge and approaches, Salt Fork of Brazos River, Hy. 18, F.A.P. 561, Stonewall Co. $120,000.

Wis., West Bend—City plans constructing 70 ft. rein.-con. bridge. $25,000. W.P.A. project. Suhr, Berryman & Peterson & Suhr, 130 North Wells St., Chicago, Ill., engrs.

Que., Domacona—Province of Quebec, Quebec City, making plans construction viaduct over Jacques Cartier River. $75,000. Dpt. Roads, Quebec City, engr.

BIDS ASKED

Ill., Chicago—Jan. 5, by Secretary Chicago Park District, Administration Bldg., Burnham Park, Chicago, Outer Drive Improvement from Chicago River to Ohio St., in connection with bascule bridge over Chicago River, completing (exclusive of electrical work) excavation, drains, sewers, electrical conduits, rein.-con. deck slabs, walls, walks, stairways, bridge houses, etc. P.W.A. project. adv. E.N.-R., Dec. 31.

Ill., Chicago—Jan. 8, by Secretary Chicago Park District, Administration Bldg., Burnham Park, Chicago, constructing 47th Street subway and Inner Drive Grade Separation Bridge, incl. (1) subway extending East 47th St., under tracks and across right-of-way of Illinois Central Ry. (2) grade separation bridge at intersection, Leif Eriksen Drive and East 47th St., extended, (3) certain sewer work, in connection with subway, etc. excavation, backfill, etc. E. A. Julius, ch. of Purch. Division; adv. E.N.-R. Dec. 31. Noted Dec. 17 C.D.—Dec. 24 E. N.-R.

Ill., Peoria—Jan. 7, by Dpt. P. Wks. & Buildings, Div. Hys., Peoria, constructing 50 ft. steel I-beam bridge on creosoted pile abutments on Sect. 41-B-MFT; and 11x7 ft. x 30 ft. rein.-con. box culvert on Sect. 22-E-MFT, Peoria. G. H. Baker, engr. co. roads and city streets.

Maryland and **West Virginia**—Jan. 15, by State Roads Comn., Baltimore, bridge having six 138 ft., 6 in. rein.-con. open spandrel arch spans, total length 1,020 ft. clear over Potomac River between Washington Co., Md., and Shepherdstown, Jefferson Co., W. Va.

Massachusetts—Jan. 5, by Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, 1,000 ft. steel stringer bridge with concrete deck and approaches over Chicopee River, Project WPFR 33, Ludlow and Wilbraham, $75,000; 450 ft. steel stringer bridge with concrete approaches over Mumford River, WPFR 128, Sutton, $20,000; 775 ft. steel truss bridge with concrete deck and approaches over Miller River, Erving and Montague, Project WPFR 10, $50,000.

N. Y., Long Island City—Jan. 6, by Dpt. Plant & Structures, F. J. H. Kracke, comr., Municipal Bldg., New York, borings for Meeker Ave. bridge over Newtown Creek, Contr. 1.

Pennsylvania—Jan. 8, by State Hy. Dpt., at office W. Van Dyke, secy., Harrisburg, constructing pony truss bridge and native stone base course on 483 ft. Route R 05034, Sect. R1, Bedford Co., incl. 3,311 cu. yd. excav.; constructing I-beam bridge and bituminous surface on modified crushed aggregate surfacing 750 ft. Route R197, Sect. 3, Berks Co., 1,987 cu. yd. excav.; two I-beam bridges and bituminous surface and crushed aggregate base paving, 1,200 ft. Route R06084, Sects. 1 and 2, Berks Co., 952 cu. yd. excav.; erecting through steel truss bridge, rein.-con. paving, 755 ft. Hickory St., Cambria Co.; 317 cu. yd. excav.; constructing three timber decked I-beam bridges and bituminous surface on crushed aggregate base paving, 1,392 ft. Route R15129, Chester Co., 736 cu. yd. excav.; through truss bridge and rein.-con. paving 485 ft. R18013, Clinton Co., 207 cu. yd. excav.; extending existing rein.-con. arch and widening existing pavement 360 ft. Route 23048, Delaware Co., 92 cu. yd. excav.; erecting steel truss bridge native stone base course paving 1,700 ft. Route 31013, Sects. R1, R2 and R4, Huntingdon Co.; steel pony truss bridge and bituminous surfacing 994 ft. Route 33050, Sect. R1, Jefferson Co.; I-beam bridge and crushed aggregate surfacing 641 ft. Route 39063, Sect. 1, Lehigh Co.; concrete decked I-beam bridge existing abutments and bituminous surfacing 251 ft. Galeton Boro, Potter Co.; constructing I-beam bridge and bituminous surfacing 472 ft. Route 53073, Sect. 1, Schuylkill Co., 497 cu. yd. excav.; rein.-con. arch bridge, bituminous surfacing 734 ft. Route R58026, Tioga Co., 1,459 cu. yd. excav.; I-beam bridge and bituminous surface on native stone paving 450 ft. Route R61019, Warren Co.; timber deck I-beam stringer bridge and bituminous surfacing 330 ft. Route R62087, Washington Co.; timber deck I-beam bridge and native stone base surfacing 1,314 ft. Route R63060, Wayne Co.; timber decked I-beam bridge and foreign borrow surfacing 300 ft. Route 64074, Sect. 1, Westmoreland and Fayette Counties, 1,350 cu. yd. excav.; timber deck I-beam bridge and approach grading and drainage, 700 ft. Route R66062, York Co.

South Carolina—Jan. 5, by State Hy. Dpt., in auditorium of Columbia Hotel, Columbia, constructing 130 ft. rein.-con. bridge over A.C.L. R.R., city of Orangeburg, U.S. Wks. Project WPGM 111, Orangeburg Co. $21,000; one 186 ft. rein.-con. structural steel bridge over P. and N. R.R. in town of Hodges, Greenwood Co. $31,000; two rein.-con. bridges, 420 ft. on approaches to Waccamaw River bridge at Conway, FAP 320C, Horry Co. $33,000; widening two 151 ft. treated timber bridges over Lynches Lake and raising, widening 255 ft. treated timber bridge over Lake Swamp between Lake City and Johnsonville, State Project 472A, Florence Co. $5,000; 126 ft. combination bridge over Reedy Creek between Dillon and Brownsville, State Project 427C, Dillon Co. $7,000. B. M. Sawyer, hy. comr.

†**Wis., Alma**—Jan. 12, by U. S. Eng., St. Paul, Minn., constructing service bridge, walkway extension, at Lock and Dam 4 and 5, in Mississippi River.

LOW BIDDERS

New Jersey—Delaware River Joint Toll Bridge Comn., Broad St. Bank, Trenton, Dec. 21, constructing new bridge over Delaware river between Phillipsburg, Warren co., N. J. and Easton, Northampton co., Pa., from Bethlehem Steel Co., Broad St. Station Bldg., Phila., Pa. $722,746. Noted Dec. 4, C.D.—Dec. 10, E.N.-R.

†*Federal Government*

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KEEP GOING WITH Snap-on Tools

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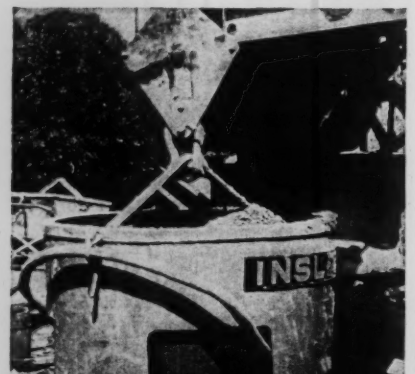

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Bridges, etc. (Continued)

CONTRACTS AWARDED

Arizona — State Hy. Dpt., Phoenix, constructing steel arch bridge over Padre Canyon and 1 mi. road mix oil-surfaced approaches Winslow-Flagstaff Hy. U. S. 66, Coconino Co., to Phoenix Tempe Stone Co., 1300 West Buchanan St., Phoenix, **$84,000.** Bids Dec. 4. Noted Nov. 18, C.D.—Nov. 26, E.N.-R.

California—E[illegible] Sullivan, dist. engr. State Hy. Comn., 247-3rd St., San Bernardino, constructing steel, concrete pedestrian overhead crossing at Maple and 7th Sts., Colton, San Bernardino Co., to Herz & Co., P. O. Box 191, San Bernardino. $9,303. Bids Nov. 18. Noted Nov. 12, C.D.

Calif., Patterson—Supervs. Stanislaus Co. (Modesto), constructing 600 ft. wooden pile and wooden deck bridge, 20 ft. wide over San Joaquin River at end of Las Palmas Ave., to H. C. Geyer, 574 Main St., Monterey, **$14,768.** Est. $17,775. Bids Dec. 15. Noted Nov. 24, C.D.—Dec. 3, E.N.-R.

Connecticut—St. Hy. Comn., J. A. Macdonald, state hy. cmr., State Office Bldg., Hartford, rein.-con. pipe culvert near Granby R. R. station, East Granby, to New Britain Truck Co., 377 Allen St., New Britain, **$1,150** ***bridge and bitulithic concrete surfacing 4,265 ft. hy., Darien Rd., New Canaan, to D. Deering, 209 Main St., Norwalk, **$91,486*** bridge over Blackberry River, Blackberry Place, Norfolk, to Brunalli Constr. Co., 85 Columbia St., New Britain, **$6,723.** Grand total $107,359. Bids Nov. 16. Noted Nov. 9, C.D.—Nov. 12, E.N.-R.

Connecticut—See "Streets and Roads."

Illinois—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing bridges in Franklin and Randolph Counties, to Condon, Cunningham & Lemon, Kirkwood, Mo. **$47,789** and **$6,761** respectively***Jackson Co., to Zimmerley Bridge Co., Paris, **$6,586***Henderson Co., to A. P. Munsen, Marion, **$21,263*** Williamson Co., to Mitchell Constr. Co., Herrin, **$34,270***railroad bridge Sect. 108SB-1, Kane Co., to Continental Constr. Co., 340 North Central Ave., Chicago, **$26,921***same project 108SF-1, to Worden Allen Co., 208 South LaSalle St., Chicago, **$20,238.** Grand total $163,825. Rejected bids Nov. 23 bridges in Will Co. Noted Sept. 18 and Nov. 10, C.D.

★**Ind., Muncie**—Delaware Co., to Midwest Constr. Co., 1 North LaSalle St., Chicago, Ill., general contract constructing East Jackson St. Bridge, **$76,866;** North Walnut St. Bridge **$83,190;** North Elm St. Bridge, **$101,998;** North High St. Bridge **$140,342;** Romy St. Bridge in Eaton **$65,822.** Grand total $553,521. Noted Oct. 30, C.D.—Nov. 5, E.N.-R.

Kentucky—Dpt. Hys., Frankfort, overhead and approaches Winchester-Irvine Rd., Clark Co., W.P.G.S. 274-A-B, to Wilson Foundation Co., Frankfort, **$26,778.** Bids Dec. 18. Noted Dec. 2, C.D.—Dec. 10, E.N.-R., under "Streets and Roads."

Maine—State Hy. Comn., Augusta, constructing Martin Stream Bridge 1, and Martin Stream Bridge 2, Project FA 313 and 30, Livermore, to W. V. Mitton, Inc., 12 Winter St., Augusta, **$25,156.** Bids Dec. 8, awarded Dec. 17. L. D. Barrows, ch. engr.

Maine—State Hy. Comn., L. D. Barrows, ch. engr. Augusta, constructing Bar Mills Bridge over Saco River, Project WPER 14, Hollis and Buxton, substructure, 3,185 cu.yd. rein.-con., to H. J. Cyr Co., Inc., 65 Temple St., Waterville, **$77,942***superstructure for same, 588 tons structural steel, to Boston Bridge Wks., Inc., Binney St., Cambridge, **$63,468***West Buxton Bridge over Saco River, Project WPFR 15, Hollis and Buxton, substructure, about 1,540 cu.yd. concrete, to J. P. McCabe, Inc., 509 East 1st St., S. Boston, Mass., **$50,494***superstructure for same, 574 tons structural steel, to Harris Structural Steel Co., Inc., 419 4th Ave., New York City, **$66,037.** Grand total $257,941. Bids Dec. 16. Noted Dec. 10, C.D.

Minnesota—State Hy. Comn., St. Paul, constructing 50 ft. bridge and approaches on Trunk Hy. 12 over Trunk Hy. 61, St. Paul, Ramsey Co., to McCree & Co., 918 New York Bldg., St. Paul and Widell Co., Mankato, **$63,470***three concrete deck girders 168 ft. long at Paynesville, Stearns Co., and 35 ft. bridge 3.5 mi. northeast of Brewster, Jackson Co., to Starbuck Constr. Co., Starbuck, **$39,264** and **$9,909** respectively***60 ft. bridge 2 mi. southwest of Herron Lake, Jackson Co., to Graves Bros. Constr. Co., Melvin, Ia., **$17,261***constructing old 160 ft. bridge truss span with new approach span 19 mi. west of Gheen, Koochiching Co., to E. W. Coons, Inc., Hibbing, **$35,089.** Grand total $164,993. Bids Dec. 11. Noted Nov. 25, C.D.—Dec. 3, E.N.-R.

Mississippi—See "Streets and Roads."

Missouri—State Hy. Comn., Jefferson City, constructing three 40 ft. I-beam spans, one 75 ft. and one 140 ft. old trusses, also two 9.5 ft. rein.-con. slab spans in Atchison Co., to R. G. Aldridge, 1310 State St., Kansas C[illegible] Kan., 180 ft. and 315 ft. cantilever tr[illegible] spans in Benton Co., to Vincennes Steel C[illegible] Vincennes, Ind. Bids Dec. 1. Noted Nov. [illegible] C.D.—Nov. 26, E.N.-R.

Neb., Papillion—Sarpy Co., repairing sup[illegible] structures, substructures and approaches [illegible] all county bridges for year, to Monarch E[illegible] Co., Falls City.

New York—Dpt. P. Wks., Div. Hys., A[illegible] bany, 7 span plate girder bridge on Gra[illegible] Central Parkway extension, east of servi[illegible] road, Northern Blvd. separation, W.F. 36[illegible] Queens Co., to Tully & DiNapoli, Inc., [illegible] 112th St., Long Island City, **$448,377.** Bid[illegible] Dec. 11. Noted Nov. 19, C.D.—Nov. [illegible] E.N.-R., under "Streets and Roads."

N. Y., Homer—Bd. Supervs. Cortland Co. Court House, Geneva, relocating 97 ft. steel concrete bridge over Tioughnioga River on County Highway 116, to H. M. Bolton, Lockland Rd., Geneva, **$27,338.** Bids noted Mar. 13, C.D.—Mar. 19, E.N.-R.

★**N. Y., Little Falls**—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, constructing grade crossing elimination, to Bates & Rogers, 174[illegible] Conway Bldg., Chicago, Ill. Est. $1,470,000. Bids Dec. 8. Noted Dec. 14, C.D.—Dec. 17, E.N.-R.

†**North Carolina** — Pub. Roads, Dpt. Agriculture, Wash., D.C., constructing bridge over Laurel Creek, Blue Ridge Parkway Project, Alleghany Co., to Simons-Mayrant Co., Charleston, S.C., **$154,000.** Bids Dec. 10. Noted Nov. 13, C.D.—Nov. 19, E.N.-R.

N. D., Valley City — City, removing old bridge and replacing it with two spans of about 55 ft. each of steel I-beams and concrete deck with two concrete abutments and center pier, to T. M. Swingen & Sons, Cooperstown. Est. $29,000. **P.W.A.** Dakota Eng. & Constr. Co., engrs.

★**Oklahoma** — State Hy. Dpt., Oklahoma City, constructing 226 ft. I-beam overpass on Frisco Lines, near Beggs, Okmulgee Co., to Brooks & Dahlgren, Insurance Bldg., Oklahoma City, **$65,026** est. $69,195***132 ft. I-beam bridge at Strafford, Garvin Co., to Merveldt & Lawson, El Reno, **$52,651** est. $58,936***310 ft. I-beam overpass at Collinsville, Tulsa Co., to Standard Paving Co., 2119 East 11th St., Tulsa, **$47,221** est. $50,652***2,080 ft. new bridge over Red River, Durant, Bryan Co., to Kansas City Bridge Co., BMA Bldg., Kansas City, Mo., **$335,510** est. $318,066. Grand total $500,408.

Oregon—State Hy. Dpt., Salem, constructing new bridge at bridge sections of Medral Springs, Secondary Hy., Baker Co., to W. C. White, Vale, **$12,088***602 ft. bridge over McCarney Creek, Oregon Coast Hy., Tillamook Co., to E. F. & W. F. Philpott, Portland, **$83,205.** Bids Dec. 17. Noted Dec. 7, C.D., under "Streets and Roads."

Pennsylvania—At office W. Van Dyke, secy. Hys., Harrisburg, 1,110 ft. timber deck I-beam bridge, rein.-con. arch and native stone base surfacing, Route 08078-08084, Litchfield Twp., Bradford Co., to Tyler & Cole, Meshoppen, **$13,974***700 ft. timber deck I-beam bridge, native stone base surfacing Route 873, Penn Twp., Center Co., to W. J. B. Murphy, Harrisburg, **$13,929***timber deck I-beam bridge and bituminous on crushed stone surfacing 425 ft. hy. Route 15071, East Vincent and West Vincent Twps., Chester Co., to L. F. Driscoll, Mt. Airy, Phila., **$14,731***0.43 mi. plate girder underpass, constructing rein.-con. bridge, dual type paving, etc. Route 131, Sect. 13, Delaware Co., to James J. Skelly Co., Media, **$119,867***447 ft. timber deck I-beam bridge and bituminous on modified broken stone surfacing Route 25004, Albion Borough, Erie Co., to E. Kean, 4923 Rosetta St., Pittsburgh, **$14,993.** Grand total $177,494. Bids Dec. 4. Noted Nov. 27, C.D.

Pennsylvania—See "Streets and Roads."

Texas—G. Gilchrist, state hy. engr., Austin, constructing Colorado River Bridge, consisting of four 200 ft. steel truss spans and eleven 52 ft. I-beam spans, on Hy. 29, F.A.P. 809-C, Burnet and Llano Co., to Austin Bridge Co., 1813 Clarence St., Dallas. **$182,393.** Est. $180,000. Bids Nov. 24. Noted Nov. 16, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing 3 multiple box culverts, Hy. 8, F.A.P. 300 and 238 reopened, Jasper Co., to Brown & Root, Inc., Colorado St., Austin, **$28,802.** Est. $40,000. Bids Oct. 20. Noted Oct. 15, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing Clear Creek Bridge, Hy. 29, F.A.P. 809-A, Burnet Co., to Clarence Jones Constr. Co., Fort Worth. **$55,069.** Est. $60,000. Bids Nov. 23. Noted Nov. 16, C.D.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, two 84 ft. span I-beam highway bridge and gravel approaches with rein.-con. abutments, on East Jamaica-North Wardsboro Rd., Jamaica, to O. A. Priest, Belmont, **$23,575.** Bids Dec. 11. Noted Dec. 10, C.D.

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†*Federal Government*

STREETS AND ROADS

BIDS ASKED

Ga., Griffin—Jan. 26, by City, c/o R. A. Drake, mayor, surfacing, curbing, storm drains, and other items. $60,000. N. S. Westbrook, City Hall, engr.

Idaho—Jan. 8, at office G. E. McKelvey, Comr. P. Wks., Boise, widening, roadbed, placing pit run subbase material over selected sections crushed gravel surfacing 13.495 mi. Lewis and Clark Hy. between Lenore and Orofino, Nez Perce and Clearwater Counties, constructing roadbed, drainage structures, crushed rock surfacing 0.974 mi. Turner Bay and crushed rock surfacing 0.794 mi. between Turner Bay and Driftwood Point, Kootenai Co.; grading, draining, crushed rock surfacing 4.61 mi. Sawtooth Park Hy. between Pahsimerol River and Salmon River Crossing, Custer Co.

Ill., Chicago—Jan. 12, by Bd. Local Imprvts., City Hall, constructing, paving 5 projects. P.W.A. project. J. B. Hittle, ch. engr. Streets.

Ill., Rock Island—See "Contracts Awarded."

Kentucky—Jan. 6, by Dpt. Hys., Frankfort, grading, draining, high type surfacing 1.633 mi. Paducah-Benton Rd., F.A. 163-C-GS and WPGH 163 CB, McCracken Co.; low type surfacing 2.3 mi. Cunningham-Milburn Rd., S.P. 485; Carlisle Co.; 6.4 mi. Brandenburg-Battletown Rd., S.P. 247, Meade Co.; 4.6 mi. Madisonville-Brazzle Bridge Rd., S.P. 416, Hopkins Co.

Kentucky—Jan. 6, by Dpt. Hys., Frankfort roadside improving 4.928 mi. Lexington-Frankfort Rd., FA 326 CP, Fayette Co.; grading, draining 1.3 mi. Petersburg-Anthoston Rd., S.P. 1278, Henderson Co.

La., Lake Charles—Jan. 11, by City Council, concrete paving Ninth St. two 24 ft. slabs one on each side of neutral ground and 4 ft. sidewalks; paving Enterprise Blvd., two 20 ft. concrete slabs on each side of neutral ground and 4 ft. sidewalks. F. Shutts & Sons, Lake Charles, engrs.

N. Y., Delhi—See "Contracts Awarded."

N. Y., Greig and New Bremen—See "Contracts Awarded."

N. Y., Rensselaer—Jan. 6, by City, rein.-con. paving 3rd Ave. from High St. to city line. Est. about $25,000. G. Haynes, city engr.

★**Ohio**—Jan. 5, by J. J. Jaster, Jr., dir. State Hy. Dpt., Columbus, grading, drainage structures stabilized base paving 3.180 mi. Desenberg Rd. County Hy. 249, WPSO 910 A, Allen and Hardin Counties, $36,871; grading, drainage structures, surface treating, stabilized surface course paving 2.302 mi. County Hy. W-44, WPSO 1033A, Hardin Co., $15,964; grading, drainage structures, cold mixed, cold laid paving 2.852 mi. Toledo-Napoleon Rd. SH 51, SH 110, Henry Co., $150,969; grading, drainage structures, stabilized paving 2.421 mi. Medina Lake Rd., County Hy. 19, WPSO 1009A, Medina Co., $39,424; grading, cold mixed, cold laid asphaltic concrete paving, roadside improvement, 3.774 mi. Sects. A and G Van Wert Paulding Rd., SH 430, U.S.R. 127, FAP 594C-Re, Paulding Co., $102,720; grading, drainage structures, traffic bound paving 3.340 mi. Moxahela Congo Rd. County Hy. 14, WPSO 994A Perry Co., $25,307; 0.276 mi. part of Chestnut Ridge Dundee Rd., County Rd. 427A, Tuscarawas o., $18,106; grading, drainage structures, natural asphaltic limestone bituminous resurfacing, roadside improvement 4.838 mi. part Sect. L and N Cincinnati-Zanesville Rd., SH 10, U.S.R. 22, FAP 661D, Pickaway Co., $106,801; grading, drainage structures, constructing creosoted timber bridge with steel beams over Kyser Run, traffic bound paving 0.208 mi. part Sect. B Mohicanville-Wooster Rd., SH 773, SR 549, Wayne Co., $10,457. Total estimate $506,619.

Pennsylvania—Jan. 8, by State Hy. Dpt., at office W. Van Dyke, secy., Harrisburg, native stone base course surfacing 1.704 ft. Route 16005 Clarion Co., incl. 3,494 cu. yd. excav.; bituminous surface course on crushed aggregate base paving, 33,649 ft. Route 890, Sect. 1, Cumberland Co., 84,787 cu. yd. excav.; bituminous surface on native stone or crushed aggregate base surfacing, 18,759 ft. Route 44, Sect. 1, Franklin Co.; bituminous surface on modified crushed aggregate base course surfacing, 700 ft. Route 41075, Sect. 1, Lycoming Co.

Pa., Titusville—See "Contracts Awarded."

South Carolina—Jan. 5, by State Hy. Dpt. in auditorium of Columbia Hotel, Columbia, concrete paving 1.878 mi. U.S. Route 501, FAP 313B, Marion Co., $58,000; earth grading 0.801 mi. FAP 320B, U.S. Route 501, Horry Co., $35,000; 3.384 mi. U.S. Wks. Projects WPMH 661 and 423 Richland Co., $83,000; 3.338 mi. U.S. Wks. Project WPMH 47, Florence Co., $26,000; concrete widening 0.249 mi. U.S. P. Wks. Project NRM 339, Richland Co., $13,000; bituminous surfacing 6.241 mi. U.S. Wks. Project WPSO 452, Charleston Co., $107,000. B. M. Sawyer, hy. comr.

Utah—Jan. 5, by State Road Comn., Salt Lake City, grading, natural rock asphalt surfacing 6.825 mi. State Hy. between Roosevelt and Ft. Duchesne, Uintah Co. K. C. Wright, state road engr.

Utah—State Hy. Dpt., Salt Lake City, takes bids within 30 days, grading, draining, gravel surfacing 6.2 mi. state hy, in Siguard Canyon, Sevier Co. K. C. Wright, state rd. engr.

†**Utah, Fort Douglas**—See "Contracts Awarded."

†**Virginia**—Jan. 21, by Pub. Roads, Dpt. Agriculture, 1725 F St. N. W., Wash., D. C., improving 0.192 mi. Project 1A2, in Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park, Spotsylvania Co. H. J. Spelman, district engr.; adv. E.N.-R. Dec. 31.

Wash., Chehalis—Jan. 5, Comrs. Lewis Co., clearing, grubbing, grading, draining, surfacing and constructing creosoted bridges and cattleways 3.2 mi. Morton-Bear Canyon Road. $50,000. B. Bantz, Court House, co. engr.

Que., Quebec City — See "Contracts Awarded."

CONTRACTS AWARDED

†**Arizona**—P. Roads, New Post Office Bldg., Phoenix, grading, draining 1.872 mi. Oak Creek Natl. Forest Highway in Coconino Natl. Forest, Yavapai and Conconino Counties, to Lee Moor Contg. Co., 807 Bassett Tower, El Paso, Tex., **$47,382.** Bids Dec. 1. Noted Nov. 17, C.D.—Nov. 19, E.N.-R.

California—State Hy. Comn., Sacramento, grading 0.3 mi. hy. at State Teacher's College Grounds, Santa Barbara Co., to C. O. Sparks & Mundo Eng. Co., 2309 East Olympic Blvd., Los Angeles, **$12,138.** Bids Dec. 9. Noted Nov. 24, C.D.

Colorado—State Hy. Dpt., Denver, gravel surfacing 2.653 mi. hy. between Florissant and Lake George on State Hy. 4, Teller Co., to Geo. W. Condon Co., 208 Grain Exchange Bldg., Omaha, Neb., **$82,716.** Bids Dec. 5, awarded Dec. 14. Noted Dec. 1, C.D.

Colorado—State Hy. Dpt., Denver, gravel surfacing 5.585 mi. hy. between Kremmling and Muddy Pass on State Hy. 2, Grand Co., to J. H. and N. M. Monaghan, 332 South Race St., Denver, **$93,650.** Bids Dec. 9, awarded Dec. 14. Noted Dec. 3, C.D.

†**Colorado**—P. Roads, Denver, Colo., improving north and south highway through Mesa Verde National Park, to L. R. Allison, Albuquque, N.M., **$126,370.** Bids Dec. 11. Noted Dec. 4, C.D.

Connecticut — See "Bridges and Grade Crossings."

Connecticut—State Hy. Comn., J. A. Macdonald, state hy. comr., State Office Bldg., Hartford, alternate 2 colprovia asphaltic concrete paving 4.265 ft. hy. New Canaan, to D. Deering, 209 Main St., Norwalk, **$90,946*****rolled gravel surfacing 4.083 ft. Curtis and Murphy Rds., Brookfield, to T. Tiano Constr. Co., 49 Prospect St., Derby, **$11,327*****rolled gravel surfacing 20,570 ft. Abbe and Powder Hill Rds., Enfield, to Bloomfield Constr. Co., Tunxis Ave., Bloomfield, **$27,839*****loose gravel surfacing, 4 bridges 32,061 ft. hy. Kent, to L. Longhi & Sons, 169 Hoffman St., Torrington, **$48,710.** Grand total $178,812. Bids Nov. 6. Noted Nov. 9, C.D.—Nov. 12, E.N.-R.

★**Illinois**—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading road in Mason Co., to Valley Eng Co., St. Charles, **$29,357*****paving St. Clair Co., to Keeley Bros. Constr. Co., East St. Louis, **$17,678*****Cook Co., to Union Contg. & Eng. Co., 30 North LaSalle St., Chicago, **$25,126*****DuPage Co., to West Counties Constr. Co., Kenilworth, **$91,345*****Randolph and Coles Counties, to Thornton & Sons, Mattoon, **$104,284*****Crawford Co., to Central West Constr. Co., 9 South Clinton St., Chicago, **$31,108*****Livingston Co., to Triangle Constr. Co., Kankakee **$29,820*****Livingston Co., to C. E. Giertz & Son, Elgin, **$110,054*****Franklin Co., to Pickus Eng. & Constr. Co., Winnetka, **$89,816*****Cumberland and Effingham Counties, to H. Riley, Shelbyville, **$55,810.** Grand total $584,357. Noted Sept. 9 and 25, Oct. 22, Nov. 1 and Nov. 12, C.D.

Ill., Rock Island—City, constructing 33 mi. sidewalks, transplanting trees, cutting other trees on various streets, relief labor. $175,000. W.P.A. project. W. Treichler, County Court House, engr.

Ia., Vinton—Benton Co., C. Culver, aud., 12,670 cu. yd. rock surfacing, material on road, to J. G. Vernon, Marion, $16,086. Awarded Dec. 14. Rejected bids 9,100 cu. yd. material.

Kansas—State Hy. Comn., Abilene, to List & Clark Constr. Co., Kansas City, Mo., earthwork and culverts on 9.062 mi. P. 18-21-FA 481F, Dickinson Co. $57,732; Bridge 0.2, three 12x10x32 ft. rein.-con. $3,530, Bridge 6.0, two 14x12x50 rein.-con. **$4,779,** Bridge 7.9, three 8x5x32 rein.-con., **$1,694,** Bridge 5.6, I-beam 60-70-60 ft., **$19,353*****to Blue Rapids Gravel Co., Blue Rapids, light type surfacing 9.081 mi. same road, **$7,408.** Grand total $94,478. Bids Dec. 15. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

Kansas—State Hy. Comn., at office Clerk Rawlins Co., Atwood, earthwork and culverts 6.219 mi. P-36-77-FA 519D, to V. N. L. Sherwood, Independence, **$58,932*****light type sur-

†*Federal Government*

Constr. News page 503

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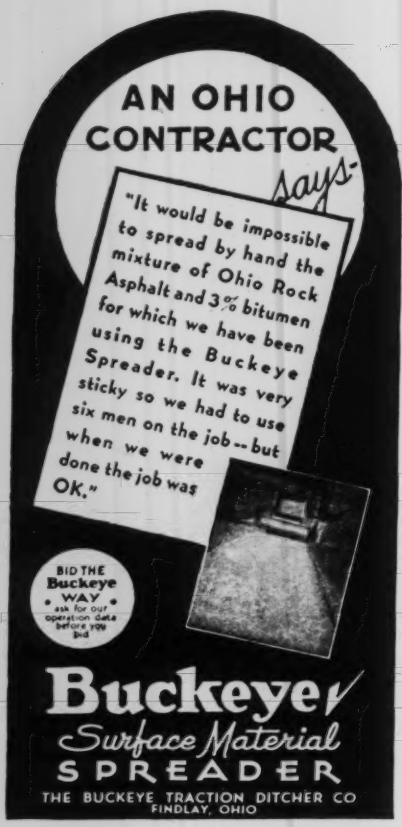
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Streets and Roads (Continued)

facing 6.23 mi. P-36-77-FA 510D, to D. G. Hansen, Logan, **$7,323*****constructing Bridge 31.3, four 12x16x111 rein.-con., P-36-77-FA 510D, to D. H. Hardman, Alton, **$19,203**, all foregoing projects in Rawlins Co. Grand total $85,458. Bids Dec. 11. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

Kentucky — Dpt. Highways, Frankfort, bank or creek gravel surfacing gravel surfacing 3.138 mi. Wickliffe-Lovelaceville Rd., Ballard Co., to Frazer & Cocke, Wickliffe, **$3,322*****traffic bound limestone surfacing 5.841 mi. Hopkinsville-Dawson Springs Rd., Christian Co., to Hopkinsville Stone Co., Hopkinsville, **$9,137*****5.2 mi. Calhoun - Buck Creek Rd., McLean Co., to S. C. Davis, Bowling Green, **$10,481** *** 11.688 mi. West Liberty-Sandy Hook Rd., Morgan Co., to Ruth Bros., Georgetown, **$26,885** *** traffic bound river gravel surfacing 7.32 mi. Uniontown-Spring Grove Rd., Union Co., to H. L. Johnson & Co., Lewisport, **$10,900*****bank or creek gravel surfacing 6.359 mi. Lynnville-Pilot Oak Rd., Graves Co., to McDade & McDade, Fulton, **$7,764*****roadside improvement 0.045 mi. Stanford-Somerset Rd., Lincoln Co., to R. Gwinn, Danville, **$4,576** ***concrete paving 6.281 mi. Hopkinsville-Clarksville Rd., Christian Co., to Foster & Creighton Co., American Natl. Bank Bldg., Nashville, Tenn., **$131,611.** Grand total $204,676. Bids Dec. 18. Noted Nov. 19, Dec. 2 and Dec. 4, C.D.—Nov. 26, and Dec. 10, E.N.-R.

★**Mississippi**—E. D. Kenna, dir. State Hy. Dpt., Standard Life Bldg., Jackson, grading, drainage structures bituminous surfacing 8.997 mi. Durant-Kosciusko Hy., Attalla and Holmes Counties, to R. M. Lilly, Baton Rouge, La., **$105,932*****grading, drainage structures, bridging 7.397 mi. De Kalb-Scooba Hy., Kemper Co. to M. Wunderlich Co., Jefferson City, Mo., **$106,129*****grading, drainage structures, alternate types surfacing 8.425 mi. Okolona-Shannon Rd., Chickasaw and Lee Counties, to Gary Reed Constr. Co., Lexington, Ky., **$180,857*****alternate types paving 13.615 mi. Mt. Olive-Mendenhall Hy., Covington and Simpson Counties, to Wesoo Co., Riverside Dr., Chattanooga, Tenn., **$255,349*****alternate types paving 7.827 mi. Columbus-Tuscaloosa Hy., Lowndes Co., to Dunn Constr. Co., 201 North Green St., Jackson, **$132,594*****grading, drainage structures, bridging, alternate types paving, 8.974 mi. Union-Philadelphia Hy., Neshoba Co., to Hardaway Constr. Co., Columbus, Ga., **$218,538.** Grand total $999,399. **P.W.A.** Bids Dec. 15. Withdrew bids to have been opened Dec. 15, grading, bridging, alternate types paving, 3.082 mi. Hattiesburg-Gulfport Hy., Forrest Co. Noted Dec. 4, C.D.

Missouri—State Hy. Comn., Jefferson City, grading, crushed stone or gravel surfacing 3.014 mi. road in Knox Co., to Rouse Constr. Co., Cape Girardeau, **$27.111.** Bids Dec. 1. Noted Nov. 18, C.D.—Nov. 28, E.N.-R.

N. Y., Delhi—Bd. Supervs. Delaware Co., Court House, grading, guttering, paving highways, own forces early in January. $130,000. Owner will buy materials.

N. Y., Greig and New Bremen—Towns of Greig and New Bremen, grading, straightening, guttering highways, constructing 400 ft. corrugated metal and rein.-con. box culverts, relief labor. $25,000. Owners will purchase materials.

Oklahoma—State Hy. Comn., Oklahoma City, grading, drainage, concrete paving 1.012 mi. Carter Co., to J. R. Alley & Co., 1200 West 21st St., Oklahoma City, **$51,632** est. $52,566***grading, drainage, rock asphalt toping 1.376 mi. Oklahoma Co., to Midwest Materials Co., Key Bldg., Oklahoma City, **$33,444** est. $35,727***grading, gravel topping 3.1 mi. Delaware Co., to M. E. Gillioz Monett, Mo., $32,347. Grand total $117,423. Bids Dec. 15. Noted Dec. 8, C.D.

Oregon—State Hy. Dpt., Salem, rock production on Lakeview Burns and Fremont Hys., Lake and Harney Counties, to Medford Concrete Constr. Co., Medford, **$60,600*****on Central Oregon and John Day Burns Hy., Harney Co., to W. C. White, Vale, **$10,180***** grading, surfacing 9.84 mi. Chalk Cliff Paisley Section Fremont Hy., Lake Co., to Itschner & Rogdon, Barlow, **$77,550*****4.1 mi. Fossil Kinzua Junction of John Day Hy., Wheeler Co., to Fisher Bros., Oregon City, **$69,625*****oil mat resurfacing 2.86 mi. Empire Marshfield Secondary Hy., Coos Co., to Babler Bros., Portland, **$20,998*****grading 1.92 mi., concrete paving 1.41 mi. and asphaltic concrete paving 20.51 mi. Rex Hill Newley Sect. West Side Hy. Yamhill Co., to Mountain States Constr. Co., Eugene, **$83,445.** Grand total $322,398. Bids Dec. 17, Noted Dec. 7, C.D.

Pennsylvania—See "Bridges and Grade Crossings."

Pennsylvania—At office W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving, bituminous on crushed stone base widening, rein.-con. structures, etc., 2.42 mi. Route 125-I, Upper Hanover and Hereford Twps., East Greenville Borough, Berks and Montgomery Counties, to J. M. Eshelman, Landisville, **$139,328.** Bids Oct. 23. Noted Oct. 19, C.D.

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Pennsylvania—At office W. Van Dyke, secy. Hys., Harrisburg, stabilized road, 4 rein.-con. bridges and rein.-con. arch, 3 mi. Routes 20062, 20072, Woodcock Creek, Cambridge Twps. and Boroughs, Crawford Co., to Holmes Constr. Co., Wooster, **$122,076*****bituminous on native or crushed stone surfacing 1.26 mi. Route 21011, Middlesex Twp., Cumberland Co. and 1.38 mi. Route 66149, Lower Windsor Twp., York Co., to Young Constr. Co., Hollidaysburg, **$16,391** and **$18,753** respectively***rein.-con. bridges Ang, 3 rein.-con. bridges 4.92 mi. Route 709, Sect. 5, Conneaut Twp., Erie Co., to George S. Mellert-Widner Co., Medina, **$177,339*****bituminous on native or modified broken stone surfacing, foreign borrow facing, grading, drainage, etc., 0.71 mi. Route 64037, Sect. 1, Salem Twp., Westmoreland Co., to John Kirch & Son, 900 Brocket St., Pittsburgh, **$24,638.** Grand total $359,197. Bids Dec. 4. Noted Nov. 27, C.D.

Pa., Titusville—City, black top on crushed stone paving East Elm St. from Drake Petroleum Sts., day labor under supervision of J. Fay, city engr. $25,000. City will purchase materials and equipment.

Rhode Island — State and Providence Plantations, Div. of Contracts, Standards & Purchase, Providence, concrete paving 1,565 sq. yd. and bituminous macadam paving 13,764 sq. yd., Project FAP 88, Narragansett and South Kingston, to J. J. McHale & Son, Inc., 104 Ferris St., Pawtucket, **$125,581.** Bids Nov. 30. Noted Nov. 24, C.D.

Tennessee—State Hy. Dpt., Nashville, roadside development, 5.966 mi. State Hy. 112 from near Cheatham Co. line to Clarksville, Montgomery Co., to McDade & McDade, Fulton, Ky., **$46,558** *** constructing paving L. & N. R. R. overhead and approaches Sutherland Ave. city of Knoxville, Knox Co., to H. B. Garrett, Knoxville, **$56,852** *** constructing and paving C. N. O. and T. P. R. R. overhead and approaches East Ninth St. and grading, draining, paving 0.147 mi. Non System Hy. city of Chattanooga, Hamilton Co., to J. E. Milan, Inc., Atlanta, Ga., **$259,116.** Grand total $362,526. Bids Dec. 18. Noted Dec. 9, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures 10.254 mi. State Hy., 29, FAP 809 A and B, Burnet and Llano Counties, to Allhands & Davis, Southwestern Life Bldg., Dallas, **$153,164.** Est. $150,000. Bids Nov. 23. Noted Nov. 16, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, grading, small drainage structures 8.833 mi. State Hy. 8, FAP 30C and 238 reopened U. S. 2, Jasper Co., to J. S. Moore & Sons, Lufkin, **$99,166.** Est. $100,000. Bids Oct. 20. Noted Oct. 15, C.D.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, crushed gravel mixed in place surfacing cutback asphalt and refined tar 0.944 mi. Project WPGH 12A, Route U. S. 7, Dorset Co., to Barrett & Flaherty, 6 East Ave., Adams, Mass., **$43,625.** Bids Dec. 11 awarded Dec. 18. Noted Dec. 10, C.D.

Wash., Chehalis—Comrs. Lewis Co., constructing 5 mi. Coal Creek and Scheuber Roads, to Graham Bros. & Medley, Chehalis, **$42,683.** Bids Nov. 2. Noted Oct. 15 C.D.—Oct. 22, E.N.-R

Wash., Seattle—Bd. P. Wks., County-City Bldg., paving center strip on Rainer Ave., Unit 2, Dearborn to Mead Sts., to Northwest Constr. Co., 3950 6th Ave., N.W., **$89,918** est. $96,409; Dearborn St., 5th Ave. S. to Rainer Ave., to L. W. Dowell, 1437 Ellicott Ave. W., **$18,965** est. $24,793. Bids Dec. 17. Noted Dec. 8, C.D.—Dec. 10, E.N.-R.

N. S., Halifax—A. S. MacMillan, minister Hys., bituminous surface course 24.9 mi. Provincial Hy., to Dufferin Paving & Crushed Stone, Ltd., Fleet St. W., Toronto, Ont.

★**Que., Quebec City**—City, amiesite surfacing 25 mi. Route from St. Anne de la Perade, 20 ft., day labor. $800,000. Dpt. Roads, Quebec City, engr., will purchase materials.

EARTHWORK IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

Calif., Alameda—City plans municipal yacht harbor, dredging, boating facilities, etc. To exceed $25,000. G. Sperbeck, city engr.

★**Neb, Cambridge**—United Power & Irrigation District, plans constructing irrigation work and limited power lines. $939,568. Applied for P.W.A. funds. C. E. Mickey, Lincoln, engr.

N. Y., Lyons—Village, c/o G. S. Miller, clk., Village Hall, plans riprapping and dredging Black Brook for 8,000 ft. and repairing 2 bridge abutments, lowering 2 watermains.

†*Federal Government*

Earthwork, etc. (Continued)

which interfere with dredging operations. Est. about $12,000. Applied for W.P.A. grant. G. Fremouw, c/o owner, engrs.

Pa., Titusville—City and Commonwealth of Pennsylvania City Hall and Harrisburg. J. Fay, city engr., in charge, plans removal of certain islands from Oil Creek to aid in navigation. $22,000. May seek Federal aid to finance. Project submitted to War Department for approval. **Maturity in 1937.**

Tex., Houston—Gulf Portland Cement Co., 801 Trinity Life Bldg., Fort Worth, preliminary plans erecting docks and building a manufacturing plant on north side of Houston Ship Channel, plant will have daily capacity of 500,000 lbs. of cement. $100,000.

BIDS ASKED

†**Arizona**—Jan. 18, by Bureau Reclamation, Phoenix, constructing spillway at Mormon Flat Dam, Salt River Project, Maricopa Co., incl. 122,800 cu. yd. dirt; 750,000 lb. reinforcement bars, 4,550 ft. 4- to 8-in. sewer, installing electrical apparatus for control of spillway gates, 25 mi. northeast of Mesa.

La., Shreveport—Jan. 14, by Bd. Comm., constructing 600 lin. ft. tetrahedron retards adjacent to pile dyke at Corner Place in Red River, 25 mi. north of Shreveport in Caddo Parish

New York—Jan. 29, by U.S. Eng., 1st District, New York, dredging about 112,000 cu. yd. place measurement in Newtown Creek; adv. E.N.-R. Dec. 30.

LOW BIDDERS

★**Minn., Red Wing**—U.S. Eng., 615 Commerce Bldg., St. Paul, Dec. 18, constructing Dam 3, in Mississippi River, from A. Guthrie & Co., Inc., 424 Endicott Bldg., St. Paul. Est. $3,000,000. Noted Nov. 18, C.D. —Nov. 26, E.N.-R.

CONTRACTS AWARDED

†**California**—U.S. Eng., Post Office Bldg., Sacramento, constructing levee in vicinity of Bear River, to Morrison Knudsen Co., Post Office Box 1518, Boise, Idaho, $148,073. Bids Dec. 4. Noted Nov. 17, C.D.—Nov. 19, E.N.-R.

†**Florida**—U.S. Eng. Jacksonville, constructing 2 steel sheet piles and creosoted wood bulkheads at Casey's Pass, to Tidewater Constr. Corp., Campostella Bridge, Norfolk, Va., $104,289. Bids Dec. 12. Noted Nov. 4, C.D.—Nov. 12, E.N.-R.

†**Ill., Lake Calumet**—U.S. Eng., U.S. Post Office Bldg., Canal and Van Buren Sts., Chicago, dredging and disposing 2,169,000 cu. yd. Lake Calumet, to Johnson Constr. Co., and LaCrosse Dredging Co., 1411 Foshy Tower, Minneapolis, Minn., $382,744. Bids Nov. 30. Noted Nov. 5, C.D.—Nov. 12, E.N.-R.

†**La., Monroe**—U.S. Eng., Vicksburg, Miss., Constructing steel, sheet pile levee wall here, to Morrison-Glasscock-Conor Co., 615 City Bank Bldg., Kansas City, Mo., $131,619. Bids Dec. 3. Noted Nov. 9, C.D.—Nov. 12, E.N.-R.

Neb, Louisville—State, Lincoln, dike and protection work along Platte River near here, to Inland Constr. Co., 3867 Leavenworth St., Omaha, $22,912. A. C. Tilley, state engr.

N. J., Forked River—State Dpt. Commerce & Navigation, Trenton, excavating, grading, gravel paving, and appurtenances, Inland Waterway Terminal, to E. M. Brown, Forked River, $4,518. Bids Dec. 21. Noted Dec. 8, C.D.—Dec. 10, E.N.-R.

†**Tex., Galveston**—U. S. Eng., Trust Bldg., dike repairs, for Louisiana and Texas Intracoastal Waterway, repairing and extending dike at entrance into Galveston Bay, Port Bolivar, to Stroman Constr. Co., Box 281, Victoria, at $1.63 per sq. ft. Bids Dec. 9. Noted Dec. 1, C.D.

B. C., Lulu Island—Dpt. Public Wks., Ottawa, bank protection, to L. H. Rawlings, Victoria, $20,679. K. M. Cameron, Ottawa, Ont., engr.

UNCLASSIFIED

PROPOSED WORK

Arkansas—DAM, etc.—White River Power Co., c/o Arkansas Power & Light Co., Little Rock, or c/o Electric Bond & Share Co., 2 Rector St., New York, plans dam and 102,000 h.p. hydro-electric plant on White River, at Wild Cat Bend. Federal Power Comn. has authorized project.

★**Calif., Fresno**—POWER DEVELOPMENT —City to vote on proposal to issue bonds Feb. 25, for $2,990,000 to finance purchase and improvement of distributing system of San Joaquin Light & Power Corp., within city limits.

★**Calif., San Francisco**—RAPID TRANSIT SYSTEM — City and San Francisco Co. plans rapid transit system. Bd. Supervs. provides $50,000 to finance preparation of plans for rapid transit system and studies of certain Market St. railway feeder lines, incl. in the appropriation is $7,500 to finance investigation of Market St. railway lines adjacent to proposed subway system for which a $6,775,000 grant from P.W.A. is pending.

★**Colorado and Utah** — RAILROAD IMPROVEMENTS, etc. — Denver & Rio Grande Western R.R. Co., A. O. Ridgway, ch. engr., Denver, W. McCarthy, trustee, Denver, Colo., petitioned Federal Court for $18,300,000 for improvements and maintenance of rights-of-way and equipment during 1937, would include $6,350,000 in changing track, reducing grades and curves, and 16,000 tons of new steel rails. $3,000,000 also included for 15 new locomotives and other equipment.

Ia., Knoxville—SWIMMING POOL—City, F. Crawford, clk., plans swimming pool. $25,000. Committee formed, circulating petitions requesting a date be set for special election to vote $14,500 bonds.

La., Natchitoches—RECREATION PARK—City plans municipal recreation park, incl. swimming pool, bathhouses, sanitary sewer and septic tank systems, water well and pumping equipment. Application filed with P.W.A. for $32,367 loan and grant. Hunt & Dibden, Natchitoches, engrs.

Mich., Kalamazoo — STADIUM BOWL — Western State Teachers College, F. S. Genjamin, Dist. W.P.A. dir., plans rein.-con. stadium bowl plain found. $196,000. W.P.A. project. Private plans.

Minn., Melrose—TRANSMISSION LINES—Stearns County Cooperative Electric Assn., G. Determan, secy.-treas., plans constructing rural electric transmission lines. To exceed $50,000 (not official). To seek R.E.A. funds.

Mont., Great Falls — FAIR BUILDING — North Montana State Fair, c/o H. F. DePue, mgr., preliminary plans constructing building to house mercantile exhibits and additional horse barn. $15,000. P.W.A. project. Cottier & Herrington, Great Falls, archts.

Nebraska — POWER LINES — Nebraska Power Co., 17th and Harney Sts., Omaha, plans constructing 24 mi. power lines in Washington Co.; 1.5 mi. lines in Dodge Co. and 15 mi. in Saunders Co. $30,000. Petition filed with State Railway Comm. F. E. Smith, ch. engr.

Neb., McCook—DISTRIBUTION SYSTEM—McCook Public Power District, franchise failed at special election, to construct power distribution system. $341,818. Project will probably be abandoned. O. R. Toman, Lincoln, engr. Noted Nov. 25, C.D.—Dec. 3, E.N.-R.

Neb., St. Edward—TRANSMISSION LINES—Boone and Nance Rural Public Power District, St. Edward, plans constructing rural transmission lines. Petition filed with state engineer for organization. Henningson Eng. Co., 326 Union State Bank Bldg., Omaha, engrs.

★**N. J., Bayonne** — TERMINAL — City and Central R.R. of New Jersey, Communipaw Ave., Jersey City, rail and water terminal. Project in abeyance. New Jersey Court decision declared monopoly granted to Central of New Jersey R.R. under plan was illegal. Project will be revised. $5,000,000. Noted June 10, C.D.—June 18, E.N.-R., under "Contracts Awarded."

N. Y., Amherst — TRANSMISSION STATION — Buffalo Broadcasting Corp., Rand Bldg., Buffalo, made plans constructing WKBW and WGR transmission stations on Sweet Home Rd. $25,000. R. E. Pfohl, 204 Huron St., Buffalo, engr.

N. Y., Batavia—City, City Hall, plans installing street lights. To exceed $23,000. Applied for W.P.A. funds. Owners will supervise work and buy materials.

N. Y., Geneva — PARK — City, City Hall, making plans building war memorial and park, near Pultny Park. To exceed $23,000. T. L. White, c/o owner, engr.

N. Y., Jamestown—CONDUIT SYSTEM—City, Nd. Public Utilities, City Hall, plans underground conduit system for electric power lines throughout business section, replacing overhead construction. To exceed $23,000. **Maturity in 1937.** C. O. Johnson, supt.

N. Y., New Rochelle—SWIMMING POOL—New York Athletic Club, 7th Ave. and 59th St., New York, plans swimming pool, Travers Island. $150,000.

N. Y., Rochester — LIGHTING SYSTEM — Rochester Gas & Electric Corp., 89 East Ave., plans changing form of city lights, additional underground conduits, etc. To exceed $23,000. Private plans.

N. Y., Seneca Falls—FISH HATCHERY—Bd. Supervs., Seneca Co., Waterloo, plans completed fish hatchery at Canoga Springs. $35,000. Site selected. Survey complete and action expected on W.P.A. grant at once. Owners supervise.

N. Y., West Endicott—FIELD LIGHTING, etc.—City of Binghamton, Villages of Johnson City and Endicott, applied for W.P.A. funds to finance necessary additional work incl. field lighting, $10,000; additional excavation, grading and seeding, $18,234 at new tri-city airport under construction, here.

†*Federal Government*

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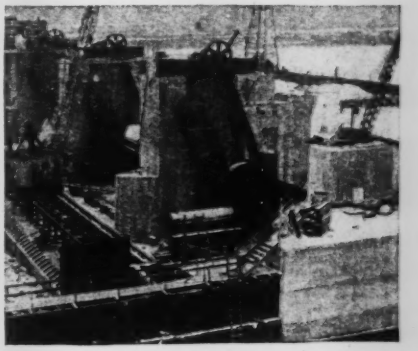
FOUNDATIONS

PRETEST UNDERPINNING

PATENTED



HEAVY CONSTRUCTION

by

Spencer, White & Prentis

Dam No. 6 on the Mississippi River at Trempealeau, Wis., and Lock No. 6 at the same city, built for the Corps of Engineers, U. S. Army, are typical Spencer, White & Prentis heavy construction jobs.

●

FOUNDATIONS
of every type

UNDERPINNING
of every type

MASS CONCRETE CONSTRUCTION

SOIL TESTS

●

Reputation
Founded Upon
Experience

PRETEST UNDERPINNING
PATENTED
TUBA STEEL CYLINDERS

SPENCER WHITE & PRENTIS

NEW YORK **DETROIT**

Unclassified (Continued)

★**O., Tiffin**—RURAL ELECTRIFICATION—J. Williams, mgr., North Central Co-operative Assn., announced approval by directors constructing 800 miles rural electrification project, affecting 2,800 homes in Seneca, Wyandot, Hancock, Crawford, Wood and Huron Counties. $884,000. Noted July 27, C.D.—July 30, E.N.-R.

Okla., Braggs—DISTRIBUTION SYSTEM—Oklahoma Gas & Electric Co., 321 North Harvey St., Oklahoma City, plans constructing electric distribution system. $23,000. Franchise voted. Bylesby Eng. Co., 231 South LaSalle St., Chicago, Ill., engrs.

Okla., Lexington — ELECTRIC LINES — Inter County Electric Co., Lexington, made preliminary plans 300 mi. rural electrical lines at and near here. $200,000. Engineer not appointed.

★**Pennsylvania** — TRANSMISSION LINE — West Penn Power Co., West Penn Bldg., Pittsburgh, plans 30 mi. transmission line, incl. about 1,000 tons steel for towers, between Charleroi and Luxor. $700,000. Private plans.

Pa., Allentown — PLAYGROUND — City, M. W. Gross, mayor, plans developing municipal playground on 8 acre site in 16th Ward, incl. baseball, softball, soccer diamonds, tennis courts and installation of various recreational equipment. $80,000. Maturity within 6 weeks expected. E. Mekley, city engr.

Pa., Allentown, Bethlehem and Easton — POLICE RADIO SYSTEM—Cities of Allentown, Bethlehem and Easton, making preliminary plans for joint police radio system, with broadcast station in central location to be selected. $30,000. M. W. Gross, mayor of Allentown in charge, E. Meckley, city engr. of Allentown, C. A. Rease, city engr. of Easton. **Maturity in 1937.**

Pa., Wilkes-Barre — RADIO STATION — Anthracite Broadcasting, Inc., c/o E. G. Smith, Publisher Times-Leader, Wilkes-Barre, plans commercial broadcasting station, incl. steel towers, control equipment and other modern facilities. $25,000 or more. **Maturity soon.**

S. D., Aberdeen—SWIMMING POOL—City plans 500,000 gal. swimming pool. $45,000. Will seek W.P.A. funds.

S. D., Brookings — SWIMMING POOL — City plans constructing swimming pool. $28,000 P.W.A. project. Project being held up by litigation. H. S. Carter, Brookings, engr.

S. D., Elk Point—RURAL ELECTRIFICATION — Union County Rural Public Power Dist. plans 107 mi. rural transmission lines. $107,000. Organization formed and application made to REA.

Tex., Corpus Christi — LOADING TERMINAL—Magnolia Pipe Line Co., Corpus Christi, plans private loading terminal to take care of oils coming in from 2 pipe lines of company. Private plans.

Tex., Houston—DOCKS—See "Earthwork, Irrigation, Drainage, Waterways."

Wis., Milwaukee—FERRY SLIP—Pere Marquette R.R. Co., H. A. Cassil, ch. engr., Detroit, Mich., plans constructing ferry slip and appurtenances at Kinnickinnic River north of Kinnickinnic Ave. Bridge.

Alta., Edmonton—GAS MAINS—Canadian Western Gas Light & Power Co., 216 Sixth Ave., subsidiary of Dominion Gas & Electric Co., Philadelphia, plans 5 mi. gas mains.

Ontario—GAS LINES—Norfolk & Middleton Gas Co., Tillsonburg, A. B. Holmes, mgr., plans laying gas lines from Tillsonburg to Straffordville. $100,000. Private plans.

BIDS ASKED

†**Calif., North Sacramento** — RAILROAD — Jan. 19, by Con. Q.M., Air Depot, Old Post Office Bldg., Sacramento, constructing standard gage railroad trackage and turnouts at new Army Air Corps Supply Depot, incl. 10,493 ft. track and 8 No. 9 turnouts, near here.

Calif., Oakland — TUNNEL WORK — See "Contracts Awarded."

N. M., Albuquerque—AIRPORT—See "Contracts Awarded."

N. Y., Solvay (br. Syracuse)—PARKING SPACE—See "Contracts Awarded."

N. C., Morehead City—SAND FIXATION MATERIALS—Jan. 7, by B. F. Royal, chn. Morehead City Port Comn., furnishing, placing materials for sand fixation, incl. grading and seeding; constructing drains and appurtenances, miscellaneous construction and equipment. P.W.A. project. G. J. Brooks, Beaufort, engr.

Pennsylvania—RURAL ELECTRIC LINES—Jan. 5, by Tri-County Rural Electric Cooperative Assn. of Mansfield, at Court House in Towanda, constructing 356 mi. rural electric lines in Potter, Tioga and Eastern Bradford Counties; also on separate rural electrification project for Sullivan and Bradford Counties. To exceed $100,000. L. Klauder, Lincoln-Liberty Bldg., Phila., engr. Noted Nov. 16, C.D.—Nov. 19, E.N.-R., under "Mansfield."

Pa., Mansfield—TRANSMISSION LINES—Jan. 5, by Tri-County Rural Electric Co-Operative Assn., Mansfield, at County Court House, Towanda, constructing 356 mi. transmission lines in 20 townships in Tioga, Bradford and Potter Counties. REA project. Est. $455,000. L. T. Klauder, Walnut St., Phila., consult. engr.

Pa., Johnstown — STADIUM IMPROVEMENT—See "Contracts Awarded."

Va., Danville — TRANSMISSION LINE — Jan. 15, by City, at office, B. A. Pollok, purch. agt., 66,000 volt transmission line from Danville, Va., Steam Station to Pinnacles Hydro-Electric Station. Chas. T. Main, Inc., engrs.

South Carolina—TRANSMISSION LINES—Jan. 19, by South Carolina Rural Electrification Authority, Columbia, constructing 174 mi. transmission lines in Abbeville, Charleston, Florence, Lancaster, Laurens, Newberry, Oconee, Spartanburg, and Williamsburg Counties. J. T. Duckett, Columbia, dir. of Authority.

Wash., Seattle—TRANSMISSION LINES—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Oakland—TUNNEL GROUTING—Directors Joint Highway Dist. 13, Court House, grouting existing tunnel lining in Broadway-Low Level tunnel under Schedule B, to R. G. Clifford, 215 Market St., San Francisco, $29,750. Award subject to **P.W.A.** approval. Bids Dec. 4. Noted Nov. 24, C.D.

Calif., Oakland—TUNNEL WORK—Directors of Joint Highway Dist., Hall of Records Bldg., completion of air ducts, paving, etc., Schedule "C" and completion of construction of ventilation building, Schedule "D" Broadway Low Level Tunnel, day labor subject to **P.W.A.** approval. Bids Dec. 9, rejected. Noted Dec. 16, C.D.—Dec. 24, E.N.-R.

Calif., Sacramento — FIRE ALARM SYSTEM—City Council, installing 22 new additional fire alarm boxes, to Gamewell Co., 7 Front St., San Francisco, $34,179. Noted Oct. 8, C.D.—Sept. 24, E.N.-R.

Calif., San Francisco—STREET LIGHTING SYSTEMS—Public Utilities Comn., City Hall, street lighting systems, erecting 50 standards, 100 transformers, 10,300 ft. primary cable, 100 luminaries, 3,800 ft. 1¼ in. black conduit, Taylor St., to R. Flatland, 1899 Mission St., $11,243. Bids for lighting system under further advisement. Noted Dec. 1, C.D.

★**N. M., Albuquerque**—AIRPORT— City, c/o City Clerk, constructing hangar, administration building, 3 mi. lighted concrete runways. **W.P.A.** relief project. $850,000.

★**New York** — TUNNEL — New York City Tunnel Authority, 200 Madison Ave., New York, manufacturing, storage and delivering 55,230 tons c.i. tunnel lining for Queens-Midtown tunnel, Manhattan and Queens Boros, to United States Pipe & Fdry. Co., Burlington, N. J., $3,356,001, subject to **P.W.A.** approval. Noted Dec. 8, C.D.—Dec. 10, E.N.-R.

★**New York**—TUNNEL—Port of New York Authority, 111-8th Ave., New York, constructing iron and cast steel lining Midtown Hudson Tunnel, to Bethlehem Steel Co., 25 Bway., New York, $3,080,252. Bids Dec. 8. Noted Dec. 9, C.D.—Dec. 17, E.N.-R.

New York—TUNNEL BUILDING—Port of New York Authority, 111 8th Ave., New York, constructing permanent field office building, Midtown Hudson Tunnel, to G. Siegler Co., 26 Journal Sq., Jersey City, $429,568. Bids Nov. 24. Noted Nov. 5, C.D.—Nov. 12, E.N.-R.

N. Y., Solvay (br. Syracuse)—PARKING SPACE—State Fair Div., Syracuse Bldg., Syracuse, constructing parking space at State Fair Grounds, moving 4 buildings to clear site for horticultural building, own forces. $127,000 W.P.A. funds allotted. G. L. Noble, Old Post office Bldg., Syracuse, procurement officer W.P.A., will purchase materials.

Pa., Johnstown — STADIUM IMPROVEMENT—City, D. Shields, mayor, stadium improvement, consisting of enclosing protected area beneath first base bleachers at Point Stadium to form warehouse for use of city, installation of lavatories, concession stands and other improvements, day labor under supervision of H. Lee Wilson, City Hall, city engr. Total est. $36,147. City will purchase materials and equipment, estimated to cost $11,761.

Tex., Brownsville — WHARF and TRANSFER SHED—Brownsville Navigation Dist., c/o Z. A. Rosenthal, chn., 1 story, additional concrete, steel warehouse, concrete ramp and wharf, additional track facilities and improvements to West End Terminal to Dodds & Wedegartner, San Benito, base bid $245,848. Est. $250,000. Awards subject to P.W.A. approval. Bids Dec. 16. Noted Dec. 2, C.D.—Nov. 5, E.N.-R.

Tex., Goliad—STADIUM, etc.—E. J. Altgelt, mgr. State Bd. Control, constructing memorial auditorium and stadium, including basket ball, to H. J. Van Rosenberg, San Antonio. $55,744*** plumbing, to [illegible] Plumbing & Supply Co., Sinton, $4,[illegible] electrical work, to Graham & Collins, [illegible] West Commerce St., San Antonio, $1,[illegible] Grand total $61,946. Bids Dec. 18. Noted Dec. 10, C.D.

Tex., Gonzales — MUSEUM — Texas Centennial Comn., constructing historical museum, exterior or Texas limestone, auditorium with seating capacity of 500, to Walsh & Burney, 928 North Flores St., San Antonio, approximately $50,000. Est. $72,000. Awarded Dec. 20. Noted Dec. 21, C.D.—Dec. 24, E.N.-R.

Tex., San Antonio — SUNKEN GARDEN IMPROVEMENTS, etc.—Bd. Control, c/o C. Teer, chn., Austin, sunken garden, amphitheatre, landscaping, excavation, shrubbery, etc., to Hill & Combs, San Antonio, $43,[illegible] Bids Dec. 15, awarded Dec. 19. Noted Dec. 10, C.D.—Nov. 12, E.N.-R.

Wash., Seattle—City Light Dpt., City Light Bldg., constructing concrete foundations for new transmission lines towers, day labor, $270,000. **W.P.A.** H. Strandberg of City Light Engineering Dpt., in charge. J. D. Ross, city engr.

MATERIALS AND EQUIPMENT

PROPOSED WORK

TELEPHONE RECEIVERS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., rejected bids Sept. 23, furnishing 14 patrol car carrier current telephone receivers. Spec. 2075. To exceed $2,000. Noted Sept. 17, C.D.

TRACTOR — **Pacific Grove, Calif.** — City, E. C. Hurlbert, clk., plans purchasing golf course tractor equipped with pneumatic tires and dump body of 1 cu. yd. capacity.

STREET SWEEPER — **San Jose, Calif.** — City plans purchasing 1 new gasoline motor-driven pick-up street sweeper.

MOTOR TRUCKS — **Tulare, Calif.** — City Council, plans purchasing 2 motor trucks and other equipment for garbage collection department. $6,000 or more.

SNOW PLOW—**Muskegon, Mich.**—Muskegon County Road Comn., plans purchasing 3 V type snow plows for work on roads this year.

TRUCK — **Bemidji, Minn.** — Beltrami Co., A. D. Johnson, aud., rejected bids Dec. 3, furnishing one 5 ton, 4-wheel drive truck with snow plow and wing and 100 hp. motor. Noted Nov. 25.

MOTOR PATROL — **Worthington, Minn.** — Nobles Co., W. C. Thom, aud., plans purchasing 1 heavy-duty motor patrol. H. R. Bray, co. hy. engr.

TANKS—**St. Louis, Mo.**—Lantz Bros. Baking Co., 38 North Sarah St., applied for permit to install one 2,000 gal. underground steel tank for private use at 38 North Sarah St.

TANKS — **St. Louis, Mo.** — H. Shore, 4884 Easton Ave., granted permit to install one 1,000 gal. and two 560 gal. underground steel gasoline storage tanks for use in automobile filling station, 4584 Easton Ave.

†STEEL PIPE—**Fort Peck, Mont.**—U. S. Eng., Fort Peck, soon takes bids 8 pcs. ½ in. thick steel pipe 10 ft. long and 29½ in. diam. and 20 pcs. 34 in. steel pipe, 20 ft. long, 28 in. diam. to be used for expansion joints in dredge pipe lines, for Fort Peck Dam, $4,500.

FIRE TRUCK—**Exeter, Neb.**—Village plans purchasing fire truck to be used in nearby rural districts.

FIRE TRUCK — **Hartington, Neb.** — Town Fire Dpt. plans purchasing modern fire truck.

FIRE TRUCK — **Loomis, Neb.** — City Fire Dpt. filed petition with town authorities to purchase fire truck.

SIGNALS—**Newark, N. J.**—City, Dpt. P. Affairs, City Hall, W. Slawson, City Hall, engr., soon takes bids, signals for Section 1, City Railway comprising loop under new Pennsylvania R. R. Station. $100,000 plus.

SAND, etc. — **White Plains, N. Y.** — Bd. Supervs. Westchester Co., Court House, plans purchasing 1,200 cu. yd. sand for beach; 400 cu. yd. screenings for parking space, for County Parks Commission. $4,400. W. Young, c/o owner, engrs.

SODA ASH—**Cincinnati, O.**—H. F. Wagner, city purch. agt., rejected bids Dec. 10, furnishing soda ash. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

CEMENT, etc.—**Cleveland, O.**—City, C. B. Patterson, purch. agt., soon takes bids 15,000 sacks cement, 1,000 tons crushed stone, 1,000 tons concrete sand and 45,000 various size fire brick.

STEEL TANKS—**Erie, Pa.**—F. Hagenlocher, 8th and Maryland Sts., plans installing 1,020 gal. steel tanks, electric pump, air compressor in gasoline service station and warehouse to be built at portion of same address as above. $1,000 or more.

†*Federal Government*

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Materials, etc. (Continued)

TRUCK, etc. — **York, Pa.** — Pennsylvania Petroleum Co., Grantley Rd. and Codorus Creek, York, plans purchasing motor truck and tank trailer. Est. $3,500.

FIRE EQUIPMENT—**Lake Preston, S. D.**—Town Fire Dpt., plans purchasing new fire equipment.

SNOW PLOW and TRUCK—**Port Washington, Wis.**—Ozaukee Co., W. J. Ubbink, comr., will purchase in open market truck and snow plow. Bids Dec. 2 rejected.

WATER METERS—**Grimsby, Ont.**—Water Comm., A. Hewson, chn., interested in prices and information for purchase of number of water meters.

BIDS ASKED

†STEEL PIPE, etc.—**San Francisco, Calif.**—Con. Q.M., Supply Officer, Fort Mason, Presidio, taking bids furnishing welded steel pipe, soil pipe, asphalt and emulsion, Douglas fir lumber, etc., Bid 928-37-203. Est. exceeds $1,000.

†TRAILERS — **San Francisco, Calif.** — Con. Q.M., Supply Officer, General Depot, Fort Mason, Presidio, San Francisco, taking bids furnishing 2 trailers, 2-wheel type, one 1,200 lbs. and other 2,000 lbs. capacity.

†TRANSFORMERS, etc. — **San Francisco, Calif.**—Con. Q.M., General Depot, Fort Mason, Presidio, taking bids 3 transformers 50- kva. capacity, distribution, 60 cycles, single phase, alternating current for operation on 2,300/400 primary to 115/230 secondary voltage, Bid 928-37-205.

COPPER TUBING—**San Jose, Calif.**—San Jose Water Works, 374 West Santa Clara St., taking bids 10,000 ft. ¾ in. type K, soft-annealed, copper water service tubing in 50 ft. coils.

CAST IRON PIPE—**South Pasadena, Calif.**—Jan. 13, by City Clerk, 290 ft. 4 in., 1,250 ft. 6 in., 52 ft. 8 in., 58 ft. 10 in., 2,700 ft. 12 in. Class 150 c.i. pipe, etc., furnishing 105 items of miscellaneous c.i. fittings, two 4 in. Corey or equal, fire hydrants and valves, AWA specifications; four 12 in., one 10 in., one 8 in., fourteen 6 in. and eight 4 in. gate valves. To exceed $1,000. F. Clough, City Hall, engr.

CAST IRON PIPE—**Watsonville, Calif.**—M. M. Swisher, city clk., taking bids 2,000 lin. ft. 6 in. and 3,000 lin. ft. 4 in. centrifugal c.i. B and S pipe, Class 150.

†STEEL, etc. — **Wash., D. C.** — Jan. 6, by General Purchasing Office Panama Canal, Wash., D. C., steel, steel pipe, lead pipe, insulated cable, Schedule 3209.

CAST IRON PIPE—**Aurora, Ill.**—Jan. 11, by Aurora Sanitary District, 410 Keystone Bldg., 624 ft. 6 in. Class A c.i. pipe; two 6 in. bends, 600 lb. lead for caulking and 25 lb. oakum.

FLASHING LIGHT SIGNALS—**Kentucky**—Jan. 20, by Commonwealth of Kentucky, Dpt. Hys., Louisville, furnishing, delivering new railroad flashing light signals and/or other protection devices with major items of materials for installation and apparatus for their operation.

†WROUGHT IRON BARS—**Boston, Mass.**—Jan. 5, by Bureau Supplies & Accounts, Navy Dpt., Wash., D.C., 22,000 lb. wrought bar iron to Boston Navy Yard, Schedule 9506.

TRUCK—**Albert Lea, Minn.**—Jan. 6, by A. C. Hartz, aud., Freeborn Co., one 5 to 6 ton four-wheel drive truck; one power hydraulic snow plow and 2 power hydraulic wings for truck. A. Pless, co. hy. engr.

†LUMBER—**Kansas City, Mo.**—Jan. 12, by U.S. Eng., Mfg. Exch. Bldg., Kansas City, 100,000 bd. ft. 1x4 ft. mattress lumber for river improvement. $2,000.

†CONTROL EQUIPMENT — **Fort Peck, Mont.**—Jan. 11, by U.S. Eng., Fort Peck, 2 sets 2,500 hp. control equipment; 2 switchboards; 3 1,500 hp. motors; 3 sets of 1,500 hp. motor control equipment for Fort Peck Dam. $80,000.

†MOTORS, etc.—**Fort Peck, Mont.**—Jan. 11, by U. S. Eng., Fort Peck, furnishing 3 sets of motors, controls, switchboard and spare parts for pump barges, for Fort Peck Dam.

†SUBMARINE CABLE—**Brooklyn, N. Y.**—Jan. 15, by U. S. Army Signal Supply Officer, Army Base, Brooklyn, 120,000 lin. ft. submarine mine cable.

†SNOW PLOW—**Cold Brook, N. Y.**—Jan. 11, by Town Bd. of Ohio, Cold Brook, motor driven snow plow. To exceed $1,000. J. Filke, supt.

CRANE—**New York, N. Y.**—Jan. 12, by Bd. Transportation, J. H. Delaney, chn., 240 Hudson St., additional crane and other equipment for 207th Street shops and Jamaica Yard, Contr. Y-12.

PATROL and EMERGENCY CAR—**Canton, O.**—Jan. 4, by R. A. Bauhof, Safety Service Dir., six or eight cylinder motor on 1½ ton chassis, electric air horns, shatterproof glass, $1,800.

WATER METERS—**Glenfield, Pa.**—Jan. 4, by F. W. Schneider, secy. of Borough, furnishing not less and not more than 200 water meters.

STONE, etc.—**Harrisburg, Pa.**—Jan. 4, by Dpt. Property & Supplies, 1,525 tons stone, P-1847, Delaware Co.; 800 tons stone, P-50145, Franklin Co.; 1,310 tons stone, P-69355, Juniata Co.; 1,000 tons cinders, P-58492, Indiana Co.; 1,800 tons cinders, P-1877, Richmond.

PIPE, etc.—**Reading, Pa.**—Jan. 5, by R. E. Schoener, controller, Berks Co., 2,100 ft. 10 in. c. i. pipe or same amount asbestos cement pipe, seven 6 in. valves, seven 5 in. fire hydrants, 120 ft. 6 in. c. i. pipe or same amount asbestos cement pipe, two tons special castings. To exceed $1,000. R. Houck, Court House, co. engr.

METERS—**Wilkes-Barre, Pa.**—City in market for 200 parking meters for installation in Public Square parking zones. $11,600. **Maturity early in 1937.** W. P. Johns, city engr.

FIRE HOSE—**East Providence, R. I.**—Jan. 5, by Town, Town Clerk, Town Hall, 4,000 ft. 2½ in. fire hose.

STEAM and WATER PIPING, etc.—**Knoxville, Tenn.**—Jan. 8, by University of Tennessee, Sub-Project 3, steam and water piping, feedwater equipment, metering equipment, valves and auxiliaries; Sub-Project 4, coal handling, coal crushing, coal storage, coal weighing equipment, P.W.A. Tenn. 1184-R-S Funds available for Project 3. $25,000, for Project 4 $15,250. Barber & McMurry, 517½ West Church Ave., archts.

STEEL CABLE—**Knoxville, Tenn.**—Jan. 8, by Tennessee Valley Authority, Knoxville, furnishing galvanized steel cable for Norris-Alcoa 154 k.v. line. C. H. Garity, dir. purchases.

†PUMP PIT—**Huntington, W. Va.**—Jan. 11, by U. S. Eng., Huntington, constructing pump pit, installing domestic water supply system at U. S. Gallipolis Locks and Dam on Ohio River.

CEMENT, etc.—**London, Ont.**—W. Veitch, city engr., bids about Feb. 1, cement, asphalt, iron, castings, manholes, road oil. Est. about $150,000.

ALUM—**St. Thomas, Ont.**—J. W. Peart, 474 Talbot St., in market for supply 3 carload alum for water purification purposes, for Municipality.

TANKS, etc.—**Quebec City, Que.**—A. Royer, 206 Chateauguay St. in market for two 1,000 gal. steel gasoline tanks, two single pumps and other service station equipment. To exceed $1,000.

PIPE—**Sutton, Que.**—Municipality, in market 2,000 ft. 10 in. c. i. pipe with all necessary valves and fittings for extension of intake pipe. J. Kemp, Town Hall, engr.

CONTRACTS AWARDED

PUMPING UNITS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., electric motor driven pumping units, 1 each horizontal centrifugal pump, 2,250 gpm at 175 ft. head, two each same, 5,000 gpm at 180 ft. head, 1 same, 18,000 gpm at 66 ft. head, two each same, 18,000 gpm at 86 ft. head, 1 each vertical mixed-flow type pump, 18,000 gpm at 25 ft. head, Spec. X-67 to Worthington Co., 5075 Santa Fe Ave., $38,000. **P.W.A.** Bids Nov. 23, awarded Dec. 15.

STEEL PENSTOCK—**Los Angeles, Calif.**—Supervs. Los Angeles Flood Control Dist., 205 South Broadway, C. H. Howell, engr., steel penstock for outlet works of San Gabriel Dam No. 1, involving 2,133 lin. ft. 123 in. I.D. welded steel 19/32 in. plate, 93 lin. ft. 123 in. I.D. welded steel ½ in. plate, 1,099 lin. ft. 96 in. I.D. welded steel, ⅜ in. plate, to Western Pipe & Steel Co., 5717 Santa Fe Ave., Vernon, $169,283. Bids Dec. 15, awarded Dec. 18. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

SWITCHBOARD—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., 1 dead front, dead rear, cubicle type switchboard at Fletcher Drive Pumping Station, Spec. X-72, to Quality Electric Co., 1235 East Olympic Blvd., $25,811. Bids Nov. 6, awarded Dec. 18. Noted Oct. 28, C.D.

TUNNEL RIBS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., 500 sets tunnel ribs involving 250 sets 12½ lb. I-beam and 250 sets 20 lb. H-beam, Spec. 2146, to Commercial Shearing & Stamping Co., 5717 Santa Fe Ave., Vernon, $7,425. Bids Dec. 8, awarded Dec. 15. Noted Dec. 1, C.D.

REINFORCING STEEL—**Oakland, Calif.**—W. W. Chappell, city clk., to Herrick Iron Wks., 18th and Campbell Sts., 475 lb. ½ in. round bar, bent reinforcing steel for Leon Creek Culvert on Cemetery Ave., $3,142; 17,762 lb. ½ in. round bar straight, $2,832; 45,777 lb. ½ in. square bar, bent, $3,142; 1,734 lb. ¾ in. round bar, bent, $2,936; 108 lb. ¾ in. round bar, straight, $2,626. Noted Dec. 11, C.D.—Dec. 17, E.N.-R.

PIPE—**Bemidji, Minn.**—City, B. Denley, clk., about 2,400 lin. ft. 6 in. c. i. pipe, to E. W. Buckley Co., Bemidji, $3,564. Bids Dec. 7.

†Federal Government

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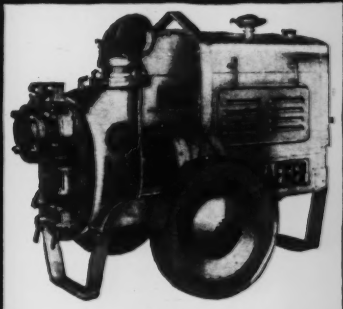
BUYING A PUMP?



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Materials, etc. (Continued)

VALVE—**Minneapolis, Minn.**—City, one 30 in. flange-end and gate valve for Waterworks Dpt., to Rensselaer Valve Co., Ontario St., Troy, N. Y., $873. Bids Jan. 21. Noted Dec. 9, C.D.

CONCRETE MIXER—**Jackson, Miss.**—E. D. Kenna, dir. State Hy. Comn., Standard Life Bldg., furnishing one 2 or 4 bag concrete mixer, to Woodward Wight Co., Ltd., 451 Howard Ave., New Orleans, La., $1,157. Est. $2,000. Bids Nov. 17. Noted Nov. 10, C.D.

TRUCKS, etc.—**Raleigh, N. C.**—Div. Purchase & Contr., A. S. Brower, dir., 2,100 pcs. mineral surface asphalt plank, to Easterby & Mumaw, Box 1295, Charlotte, $743***1,000 ft. 1 in. hexagon Hollow drill steel, to Dillon Supply Co., 216 South West St., Raleigh, $367 ***12 casks ⅝ in. proof coil chain, f. o. b. Raleigh, to J. McGraw, Inc., 803 East Cary St., Richmond, Va., $900***1,100 creosoted sign posts, f. o. b. Greensboro, to Taylor Colquitt Co., Spartanburg, S. C., $660***9,405 bd. ft. creosoted timber, 720 lin. ft. creosoted piles, f. o. b. Pembroke, to Wood Preserving Corp., The Up King, Charleston, S. C., $1,080 ***2 close cable pick-up trucks, f. o. b. Raleigh, to Chevrolet Motor Co., 522 West 11th St., Charlotte, $440 each. Grand total $4,630. Bids Dec. 17. Noted Dec. 11, C.D.

SNOW PLOW—**Jamestown, N. D.**—Stutsman Co., one hydraulically operated snow plow, to Lewis Tractor & Mchy. Co., $2,872. Bids Dec. 4. Noted Nov. 24, C.D.

SPECIAL CASTINGS, etc.—**Cincinnati, O.**—City, H. F. Wagner, purch. agt., 50 tons special castings and 45,000 lin. ft. 23 in. 4- to 12-in. c. i. pipe, to U. S. Pipe & Fdry. Co., Addyston, near Cincinnati, $47,007; 33,400 lb. pig lead, to J. H. Homan Metal Co., 824 Reedy St., $1,904. Bids Dec. 1, awarded Dec. 8. Noted Nov. 27, C.D.

DIESEL OIL ENGINE GENERATING UNIT, etc. — **Grove City, Pa.** — Grove City Borough, furnishing Diesel oil engine and generating unit for municipal power plant, 930 h.p. with 600 k.w. generator, to Cooper-Bessemer Corp., Grove City, $57,327. Bids Dec. 18, awarded Dec. 21. Noted Dec. 7, C.D.—Dec. 10, E.N.-R.

PUMPS, etc.—**Antigo, Wis.**—City, to A. M. Weisie, Antigo, Pomona deep well pump, $1,934; A. C. high head pump $1,117; electrical equipment, $522. Grand total $2,673. Bids Dec. 9. Noted Dec. 7, C.D.

TANKS—**Parco, Wyo.**—Sinclair Refining Co., 630 5th Ave., New York, bulk storage tanks, containing about 200 tons steel, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill.

SULPHATE ALUMINA, etc.—**Ottawa, Ont.**—Municipality, supplying 1,200 tons sulphate alumina, to Keyes Supply Co., Ltd., Albert St., $34,200***25,000 lb. liquid chlorine, to Nicholas Chemical Co., Ltd., Montreal, Que., $2,238***350 tons lime to Shane Lime & Charcoal Ct., Ltd., Eganville, $2,625. Grand total $39,063. Noted Nov. 23, C.D.—Nov. 26, E.N.-R.

FOREIGN

China—Chinese Government, Railway Ministry, Nanking, rehabilitation of railway from Peiping to Hankow, separate contracts awarded. To exceed $5,000,000.

China, Shanghai—V. Berlinconi & Co., 264 Kiangse Rd., in market for considerable tonnage of iron and steel scrap. Custom duty 0.55 gold unit per 100 kilogrammes.

Egypt, Port Said—G. J. Zahar, 5 Rue Sultan Abdel Mequid, in market for oil paints and varnishes. Custom duty 15% ad valorem plus 2%. Quotations should be accompanied by samples and must be c.i.f Port Said.

England—Warden & Hotchkiss, Ltd., 41 Clement St., Birmingham, in market for supplies of wide variety of items used in building trade generally***City Engineer, **Lancaster**, making plans widening Skerton Bridge, constructing new school, library addition, constructing aerodrome $3,500,000*** **Dewsbury**, Municipality, making plans 244 additional houses at Overthorpe Hall Estate $600,000.

England—R. Cromble, 6 Cavindish Square West, **London**, theatres and commercial block on Corporation St., Birmingham, to Philpot Bros., Ltd., Much Park St., Coventry, $550,-000***H. S. Fleming, 83 Pall Mall S. W., **London**, plans blockade of flats at Amherst Park, London, $500,000***Wood & Co., Golders Green S. W., **London**, plans theatre, assembly hall, etc. at Mill Hill, $600,000***T. H. Mawson & Son, 13 Victoria St. S. W., **London**, plans housing development on Edgeware Rd., $1,000,000 *** London Passenger Transport Board, **London**, plans underground railway extension from Morden to Elstree, $800,000 ***George Coles, 40 Craven St. W. C., **London**, plans constructing super-theatre and commercial block on Burlington St., London, $600,000 *** D. Hamilton, 366 Oxford St. West, **London**, plans office building, for British Institute of Engineering Technology, $1,000,000***A. W. Moore, 124 Fenchurch St. E. C., **London**, plans office building at Mincing Lane, $750,000***London Passenger Transport Board, **London**, taking bids supplying and erecting 589 mercury dis-harge lamps, $72,515***H. Hamilton, 27 Park Lane West, **London**, plans block of flats for Sam Remo Estates, Ltd., $1,000,000***L. H. Kemp, 10 Great James St. W. C., **London**, plans 3 more theatres, for Union Cinema Co., Ltd., Belfast, $400,000 each *** East Norfolk Rivers Catchment Bd., **Norfolk**, plans by Weeks Bros., for scheme for arresting Yar erosion, $1,315,000 voted *** E. S. Roberts, Lombard House, Great Charles St., **Birmingham**, plans theatre for Maple Cinemas, Ltd., $525,000*** **Salford** Town Council approved constructing 589 houses near Kersall Moor in conjunction with Cassell & Son, Ltd., $1,434,000***Housing Committee of Corporation, **Newcastle-on-Tyne**, plans 2,600 additional houses at Blakelaw, $2,900,000. Plains available after January***Derby Town Council voted to construct 470 additional houses on Roe Farm Estate, $1,170,000. Private plans***Surrey, City Council, associated with County Education Council voted to erect mental Institution, $580,000*** **Woolwich** Borough Council voted $1,708,800 for power extension scheme and taking bids this month, including 30,000 k.w. turbo-alternator, 2 boiler units, etc.***C. Castin & Co., Ltd., **Wembley**, plans 394 houses on Preston Manor Estate, $978,000***A. C. Cook, Paganhill Lodge, **Stroud**, plans housing development for Straud Housing Estates, Ltd., $1,000,000 ***Stockton-on-Tees** Town Council voted $1,-109,980 for paving construction by day labor. ***Buckhaven** Town Engineer, interested in prices of steam shovel and other equipment ***Dudley** Town Council, 248 houses on Rosland Estate, to H. Boot & Sons, Ltd., Banner Cross Hall, Eccleshall Rd. South, Sheffield, $580,680***Stafford** Rural District Council, plans water supply scheme, western area, $551,-000*** **Leeds** Municipality plans electric expansions, $600,000 voted. Plans ready in January***A. P. Griggs, Cransborough Castle Estate Office, The Drive, **Ilford**, plans housing on Canterbury Ave. $675,000***Durham County Water Board plans constructing 200,000 gal. rein.-con. reservoir***Joint Tramway and Electricity Bd., **Hyde** taking bids next month for switchgear and transformers, $125,000*** Hampshire County Council, **Knowle**, voted $545,000 for additions to Mental Hospital*** **Sheffield** Education Committee of Corporation voted $945,000 for 1937 school construction*** Education Committee of Corporation, **Birmingham**, plans school construction, $5,944,400. Plans ready in February***Public Assistant Committee of Corporation, **Bristol**, plans 300 homes at Eastville, $600,000.

England, Southampton—Town Clerk taking bids constructing supplying and erecting diesel electric pumping plant, including with engine speed of 300 r.p.m., generators, motors, low lift and high lift pumps and auxiliary equipment to lift 5,000,000 a day against a head of approximately 270 ft.

France, Paris—French Air Ministry preparing plans constructing aerodrome on Island of Terceira in Azores. Costes & Codos, engrs.

Germany—Municipalities of Duisburg and Hamborn, Germany, constructing sewage disposal plant, on Emacher River, in Rhur District, separate contracts awarded. To exceed $500,000.

Hungary — Ministry of Interior, Hungarian Government, Budapest, bids in January or February, power plants and distribution, transmission lines to supply 90 communities 2,500,000 pengo.

Iran, Teheran—Municipality taking bids for supplying material and installing complete system of waterworks. $2,000,000. Particulars, plans, specifications, forms of tenders can be obtained from any Imperial Iranian Legation or Consulate General or from Commercial attache, 13 South St., Moorgate E. C., London, England.

Mexico—Compania de Petroleos de Mexico, Mexico City, plans 240 kilometer gas pipe lines from Ponza Rica (Vera Cruz State) to Mexico City.

New Zealand, Auckland—M. R. Hornibrooke Proprietary, Ltd., Brisbane, Australia, plans bridge over harbor at Fanshaw St., $7,000,-000, 2 viaducts for causeways, $1,125,000.

Peru, Oroya—Cerro de Pasco Copper Corp., 44 Wall St., New York, plans lead refinery and smelter plant. $700,000.

Wales, Cardiff—Edward Curran & Co., Ltd., Bute Docks, in market for considerable quantity of feldspar and quartz. No custom duty. Samples should be forwarded with prices.

Yugo-Slavia, Zagreb—Shell Company of Jugoslavia, Ltd., plans extensive modernization and enlargement involving considerable outlay.

PUBLIC BUILDINGS

PROPOSED WORK

†**Ariz., Phoenix**—U. S. Resettlement Administration, Phoenix, preliminary plans constructing 134 homes for 4 resettlement projects, at Glendale, Chandler, Casa Grande and Coolidge, Ariz. Owner will purchase material. G. M. Shumaker, Phoenix, engr.

Calif., Agnews—State plans by G. B. McDougall, state archt., P. Wks. Bldg., Sacramento, fireproof ward buildings, $150,-000; addition to sewerage system, $20,000.

Calif., Bakersfield — Kern County Union High School Dist., working drawings started by C. H. Bigger, 554 Haberfelde Bldg., Junior High School Plant in East Bakersfield, $2[illegible]000. P.W.A. allotted $145,000 grant. M. F[illegible] 908 Washington Bldg., Los Angeles, structu[illegible] engr. Noted Nov. 16, C.D.—Nov. 19, E.N.

★**Calif., Los Angeles**—State Finance Di[illegible]tor Stockburger, during conference w[illegible] Supervs. Los Angeles Co. agreed to r[illegible] the old Times building and other structu[illegible] to the south and north of present st[illegible] building and plans adding two 8 story wi[illegible] to north side of present office building [illegible] and Hill Sts. $500,000. G. B. McDoug[illegible] P. Wks. Bldg., Sacramento, state archt.

Conn., Hamden (br. New Haven)—Town [illegible] Hamden, School Building Committee, [illegible] Richardson, pres., sketches brick, st[illegible] school additions, incl. Centerville Sch[illegible] State St. School and Church St. School. $150[illegible] 000 or more. Architect not appointed.

Conn., Hartford — State, Governor's Foo[illegible] Guard, Major George R. Sturges, 159 Hig[illegible] St., plans brick, steel, stone armory. $150,00[illegible] Architect not appointed.

Conn., Hartford — City, E. Nelson, sup[illegible] Schools, completing plans renovating bric[illegible] steel school, Washington St. $157,029. W.P.A project. T. Foley Hartford, W.P.A. agen[illegible]

Conn., West Haven (br. New Haven) — Town of West Haven Bd. Selectmen pla[illegible] new hospital. $150,000. P.W.A. projec[illegible] Architect not appointed.

Ill., Chicago—Bd. Educ., 228 North LaSal[illegible] St., general contract reconstructing and co[illegible] structing addition to Wendell Phillips Hig[illegible] School, 231 East 39th St. J. C. Christensen 228 North LaSalle St., archt.

★**Ill., Chicago**—Chicago Park District, East 14th St. and Outer Dr., plans erecting 4 or 5 story administration building, 140,000 sq. ft. floor space, Lief Ericson Dr. $1,775,000. $625,000 to be supplied by Park Dist. from bond issue and $1,150,000 to be asked from Federal Government.

Ill., Evanston—Bd. Educ., J. R. Skiles, supt. Schools, Evanston, plans by Childs & Smith, 430 North Michigan Ave., Chicago, 2 story, basement, 72x360 ft. addition to Dewey Grade School. $150,000.

Ill., Joliet — State of Illinois, Springfield, plans armory. $150,000. Will apply for P.W.A. loan.

Ill., Macomb—State Dpt. P. Wks. & Buildings, Springfield, plans by C. H. Hammond, Springfield, and soon takes bids, 4 story, brick, tile school building, at Western Illinois Training School.

Ind., Muncie—City plans constructing high school addition. $190,000. Applied for P.W.A. funds but will proceed with tax levy if loan is denied.

★**Iowa**—State Legislature, Ames, will be asked to appropriate $2,000,000 for the construction of state buildings, incl. hospital for insane at Clarinda, $166,000; hospital for insane at Independence, $200,000; hospital for insane at Mount Pleasant, $406,500; hospital for insane at Cherokee, $425,000; hospital for epileptics and feeble minded at Woodward, $303,000; soldiers orphans home at Davenport, $25,000; juvenile home at Toledo, $17,000; penitentiary at Fort Madison, $53,000; training school for boys at Eldora, $40,000; reformatory at Anamosa, $100,000; tuberculosis sanitarium at Oakdale, $85,000; institution for feeble minded children at Glenwood, $208,000.

La., Pineville — Central Louisiana State Hospital, plans by Weiss, Dreyfuss & Seiferth, Maison Blanche Bldg., New Orleans, construction hospital and dormitory building, $182,492, P.W.A. application filed for grant $82,121.

Minn., Halstead—Municipality plans by E. G. Briggs, 1955 University Ave., St. Paul, plans electric light and power plant. To exceed $40,000.

★**Minn., Hibbing** — Bd. Educ., G. D. Carmichael, pres., Hibbing, election Jan. 13, $693,000 bonds, constructing school, $1,000,000. J. C. Taylor, Hibbing, archt. Noted Aug. 27, C.D.—Sept. 3, E.N.-R.

Mo., Marshall—City, final plans in progress improving power plant, incl. pipe, pumps, etc. $215,000. Henri-Lowry Eng. Co., 110 West 10th St., Kansas City, engrs.

†**Mont., Glasgow**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office. $140,000. Funds allocated.

†**N. J., Matawan**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office. $79,000. Site selected.

†**N. J., West New York** — Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Dec. 2, constructing U. S. Post Office. $342,-000. Noted Oct. 28, C.D.—Nov. 5, E.N.-R.

★**N. Y., Binghamton**—Bd. Supervs. Broome Co., Court House, plans constructing county jail, but city of Binghamton, which pays 60% of county expenses, has entered protest against project due to cost. $500,000. Architect and engineer not appointed. Noted Dec. 9, C.D.—Dec. 17, E.N.-R.

N. Y., Boonville—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office. $83,000. Site selected. Noted Oct. 21, C.D.—Oct. 29, E.N.-R.

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†*Federal Government*

Public Buildings (Continued)

★**N. Y., Lockport**—Bd. Educ., City Hall, have been advised by P.W.A. that grant may be rescinded at once if action is not taken on selection of an architect and site for school. $858,000. Engineer and architect not appointed. Owner will take action at once. Noted Apr. 24, C.D.—Apr. 30, E.N.-R.

★**N. Y., Mount Morris**—State Dpt. Educ., Education Bldg., Albany, bids in February, 3 story, basement, 71x288 ft. new building and auditorium, at Geneseo State Normal School. $500,000. W. E. Haugaard, State Bldg., Albany, archt. T. F. Farrell, State Bldg., Albany, engr.

†**N. Y., New York**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Appraisers Stores Building. $105,000. Site selected.

N. Y., New York—Dpt. Markets, Municipal Bldg., plans 1 story municipal market, 1st Ave., 11th and 12th Sts. Est. about $33,000. Private plans. W. F. Morgan, comr. in charge.

★**N. Y., New York**—Municipal Art Center Committee, c/o Mrs. Henry Breckenridge, 455 East 57th St, plans constructing art museum. To exceed $1,000,000.

N. Y., Syracuse—Bd. Supervs. Onondaga Co., Court House, plans constructing 4 buildings and service connections at Onondaga County Sanitarium, on Onondaga Hill. To exceed $150,000. Architect and engineer not appointed.

N. C., Greensboro — Agricultural and Technical College, Dr. F. D. Bluford, pres., plans improvements and new construction at college. $300,000.

Tex., Dallas—City plans municipal auditorium on old vacated post office site, Main, Ervay and Commerce Sts. Architect not appointed.

Wis., Waukesha—Waukesha Co., plans by Clas & Clas, Inc., 759 North Milwaukee St., Milwaukee, remodeling and constructing addition to court house. $250,000.

Ont., Brantford—City, plans by H. C. Bodley, Temple Bldg., 3 story, basement, isolation hospital and tunnel to general hospital, Terrace Hill. $150,000. Noted Dec. 18, C.D. —Dec. 24, E.N.-R.

BIDS ASKED

Calif., Patton—Jan. 12, by State Dpt. P. Wks., Division of Architecture, P. Wks. Bldg., Sacramento, two 1 story, rein.-con. ward buildings, Group 16 of infirm females and Group P for infirm males, clay tile roofs, bids are wanted for (a) general work (b) electrical work (c) plumbing (d) heating and ventilating work. $300,000. G. B. McDougal, P. Wks. Bldg., Sacramento, state architect. Noted Sept. 8, C.D.—Sept. 10, E.N.-R.

†**Calif., San Francisco**—Jan. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing mint equipment, for U. S. Mint.

Calif., Springville—Jan. 2, by N. C. Wolff, secy. Tulare-Kings Joint Tubercular Sanitarium, 4 frame and stucco ward buildings, one 36 bed women's and children's ward building, 10,312 sq. ft., and three 10 bed units for general tubercular patients, 7,008 sq. ft., steam heat, signal call system, boiler for heating plants, ducts and conduits for steam and hot water transmission, etc. E. J. Kump, Rowell Bldg., Fresno, archt.

Colo., Loveland—See "Contracts Awarded."

★**Ill., Charleston**—Jan. 4, by State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, general contract, plumbing, heating, pipe covering and electrical work for Physical Education Building, for Eastern Illinois State Teachers College. $631,000. P.W.A. project. C. H. Hammond, Springfield, archt.

★**Ill., Chicago**—Jan. 8, by Chicago Park District, Administration Bldg., Burnham Park, constructing 47th St. Subway. $913,000. P.W.A. project. R. H. Burke, ch. engr.

†**Ill., Rock Falls**—Jan. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $60,000.

Ia., Iowa City—Jan. 6, by Superintendent Dpt. Grounds & Buildings, University of Iowa, steam return and air service at State University of Iowa; also for electric cable from power plant to Law Commons, and switching equipment at General Hospital at State University of Iowa.

†**Md., Baltimore**—Jan. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., plumbing, repairs and improving U. S. Immigration Station.

†**Mass., Clinton**—Jan. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $25,000. Noted Aug. 6, C.D.—Aug. 13, E.N.-R.

Mich., Detroit—Jan. 4, by C. A. Gadd, bus. mgr. Bd. Educ., 1354 Bway., 2 story, basement, brick, steel, stone, concrete school, plain found., Lakewood Ave. $150,000. J. I. Dise, 324 McKerchey Bldg., archt.; addition No. 2 to George S. Hommer Elementary School, Newport Ave., Malcolmson & Higginbotham, 1217 Griswold St., archts.

Mich., Hamtramck—Jan. 5, by F. Matulewicz, city clk., 3 story, basement, brick, steel, rein.-con., stone hospital, plain found., Falcon St. Est. $160,000. P.W.A. project. L. B. Jameson, 8580 Jos. Campau Ave., archt. Noted Nov. 9, C.D.—Nov. 12, E.N.-R.

Mich., St. Joseph—Jan. 4, by B. G. Starke, secy. Bd. Educ., 2 story, basement, brick, steel, rein.-con. school, plain found., Washington School site. $150,000. W. S. Holmes Co., Lansing, archts. Noted Nov. 9, C.D.—Nov. 12, E.N.-R.

★**Minn., Moose Lake**—Jan. 6, by State Bd. Control, D. Mullen, secy., State Office Bldg., St. Paul, general contract constructing superstructure for administration building, receiving hospital and medical center, at Fourth State Hospital. Total $2,000,000. P.W.A. project. Sund & Dunham, 512 Essex Bldg., Minneapolis, archts.

Minn., Redwood Falls — Jan. 12, by Bd. Educ., P. D. Sanders, clk., superstructure for 2 story, basement, brick, rein.-con. school. $250,000. P.W.A. project. Pass & Rockey, Mankato, archts.

★**Neb., Hastings**—Jan. 20, by State Bd. Control, L. D. Hart, Lincoln, constructing ward building, at Ingleside State Hospital. $175,000. Total $500,000. P.W.A. project. K. H. Gedney, Hastings, archt. Black & Veatch, 4706 Bway., Kansas City, engrs. Noted Dec. 9, C.D.—Dec. 17, E.N.-R.

N. Y., Hudson—Jan. 7, by State Dpt. Welfare, State Bldg., Albany, constructing colony buildings, State Training School for Girls. W. E. Haugaard, State Bldg., Albany, archt.

N. Y., Ithaca — Jan. 14, by Dpt. Educ., Education Bldg., Albany, constructing laboratory, plumbing, heating, electric elevator and dumbwaiter, at Veterinary College, Cornell University. $284,000. Noted Feb. 18, C.D.—Dec. 20, E.N.-R.

N. Y., New York—See "Contracts Awarded".

N. Y., Niagara Falls—Jan. 6, by City, W. D. Robbins, city mgr., City Hall, general contract, plumbing, heating, and electrical work for central alarm station and garage. $50,800; adv. E.N.-R., Dec. 31. Noted Nov. 30, C.D.—Dec. 3, E.N.-R.

†**N. Y., Poughkeepsie** — Jan. 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing elevator in U. S. Post Office.

†**N. Y., Yonkers**—Jan. 26, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling U. S. Post Office.

★†**O., Chillicothe** — Jan. 15, by Veterans Administration, constructing 4 story, basement, 134x185 ft., brick, main building; 2 and 3 story, basement, 148x173 ft. infirmary building, for U. S. Veterans Facility. $650,000 plus. Noted Nov. 27, C.D.—Dec. 3, E.N.-R.

O., Ohio City — Jan. 22, by Village Bd. Comn., light and power plant. $40,376. P.W.A. project. C. J. Simon, Van Wert, engr.

S. D., Sisseton—Jan. 5, by Bd. Educ., c/o C. Anderberg, clk., superstructure for 2 story, basement, 140x190 ft., brick, cut-stone school. $200,000. P.W.A. project. Hugill & Blatherwick, 367 Boyce-Greeley Bldg., Sioux Falls, archts.

†**Tenn., Knoxville**—Jan. 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., altering Uptown Postal Station.

†**Tex., Galveston**—Jan. 13, by U. S. Eng., Galveston, constructing 3 story, concrete office building and pile foundation at Fort Point, near here.

Tex., Gainesville—Jan. 5, by School Bd., constructing 2 story, 133x236 ft. brick, steel fireproof high school building, vocational room, gymnasium, auditorium, library, etc. $150,000. E. G. Withers Architectural Co., 402 Mi. Continent Bldg., Fort Worth and Gainesville, archts. Noted Sept. 28, C.D.—Oct. 1, E.N.-R.

†**Va., Arlington**—Jan. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., U. S. Post Office; adv. E.N.-R. Dec. 31.

†**Virgin Islands**—Feb. 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office and Court House. $175,000. Noted Dec. 22, C.D.—Dec. 24, E.N.-R.

LOW BIDDERS

★†**D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing apex building from McCloskey & Co., 1620 West Thompson St., Phila., Pa., $3,277,000*** elevator, from Westinghouse Electric Elevator Co., 1506 North Branch St., Chicago, Ill., $184,200. Noted Dec. 2 and 4, C.D.—Dec. 10, E.N.-R.

CONTRACTS AWARDED

Ariz., Mesa — Mesa School Dist., general contract, remodeling auditorium, gymnasium building, to P. W. Womack Constr. Co., Phoenix, $28,000***remodeling central heating plant, to Thompson Plumbing Co., 229 West Jefferson St., Phoenix, $11,000. **P.W.A.** Bids Nov. 28. Noted Nov. 4, C.D.—Nov. 12, E.N.-R.

Calif., Long Beach—Bd. Educ., 715 Locust Ave., constructing practical arts building, boy's and girl's locker and shower building at Franklin Junior High School, to J. E. Burrell & Son, 750 West Anaheim St., $163,050. Bids Nov. 25, awarded Dec. 9. Noted Nov. 24, C.D.—Dec. 3, E.N.-R.

Colo., Loveland—City, c/o City Clerk, 3 story, 62x141 ft., city hall and auditorium, W.P.A. labor. R. L. Linder, 507 Insurance Bldg., Denver, will take bids on materials.

†**Ga., Atlanta**—Veterans Bureau, Arlington Bldg., Wash., D. C., constructing elevators in Infirmary Building 3, to Otis Elevator Co., 810 18th St., New York, N. Y., $9,967.

Ill., Des Plaines—City, E. J. Friederich, clk., City Hall, general contract 2 story, basement, 55x200 ft. municipal building, Graceland and Miner Sts., to C. B. Johnson & Sons, Inc., 6 North Michigan Ave., Chicago, general contractor, let reinforcing steel to O. J. Dean & Co., 228 North LaSalle St.***windows, to Campbell Metal Window Corp., 228 North LaSalle St., Chicago***heating, to C. A. Scheimann Co., 1529 West Roscoe St., Chicago ***plumbing, to Marquette Plumbing Co., 1014 West 63rd St., Chicago. Est. $175,000.

Ill., Dixon—Dpt. P. Wks. & Buildings, Div. Eng. & Architecture, Springfield, general contract, administration building and detention building, to John Jinnare, Inc., 2816 West Monroe St., Chicago, $71,117 and $61,116 respectively***electrical work for male and female tubercular ward buildings, female ward buildings, dining rooms, male ward buildings, to Fuchs Electric Co., 30 North LaSalle St., Chicago, $54,884. Grand total $187,077. **P.W.A.** Bids Nov. 19, awarded Dec. 12. Noted Nov. 9, C.D.—Nov. 12, E.N.-R.

Ind., Hammond — Bd. Park Comrs., City Hall, general contract 2 story, balcony, basement, 108x204 ft. civic auditorium, Carroll St., Sohl and Eaton Aves., to Langlois Constr. Co., Berwyn, $337,400***heating and ventilating, to Hilbrick & Co., 5437 Hohman Ave., $37,758***plumbing, to S. Kersten, 218 South Jefferson St., Chicago, Ill., $23,300***electrical wiring, to Wadeford Electric Co., 205 West Wacker Dr., Chicago, Ill., $39,048. Grand total $437,506. **P.W.A.** Bids Dec. 14, awarded Dec. 21. Noted Nov. 25, C.D.—Dec. 3, E.N.-R.

†**Ky., Fort Knoxville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing vault lining, to A. R. Mangs & Associates, Bway. and 4th Ave., Louisville, $2,865.

†**Ky., Hodgenville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to E. Embrey, Elsby Bldg., New Albany, Ind., $47,080. Bids Dec. 3. Noted Nov. 10, C.D.—Nov. 19, E.N.-R.

†**La., Donaldsville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Brockman & Walker, 204 Camp St., New Orleans, $54,454. Bids Dec. 15. Noted Nov. 19, C.D.—Nov. 26, E.N.-R.

La., Baton Rouge—Louisiana State University, brick, rein.-con. physics and mathematics building, W.P.A. labor, $240,000. G. Caldwell, Baton Rouge, construction supt. Weiss, Drefous & Seiferth, Maison Blanche Bldg., New Orleans, archts.

Mass., Worcester—Commonwealth of Massachusetts, State House, Boston, Contr. 1, power plant piping, building alterations, boiler and setting, electric wiring, plumbing, catwalks, steps and ladders, to J. G. Lamotte & Son, Inc., 143 Federal St., Boston, $60,207; Contr. 2, refrigeration in power plant, building alterations, removal of old stack, construction of compressor room, foundations for condenser units, electric wiring, to York Ice Mchy. Corp., 200 Causeway St., Boston, $11,554. Bids Dec. 9. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

Mo., Normandy (St. Louis P. O.)—Normandy Consolidated School District, F. B. Miller, supt. Schools, 6701 St. Charles Rock Rd., general contract constructing Pasadena Hills Building, to Kellermann Contg. Co., 625 North Euclid Ave., St. Louis, $111,071***heating, to Koppen Smith Heating Co., 2628 Olive St., St. Louis, $18,356***constructing McKinley School and Garfield School, to Kloster Co., 5215 South Grand Blvd., St. Louis, $58,321 and $59,564 respectively***altering Bel-Nor, Harrison and Lincoln Schools and constructing Washington School addition, to Robert Paulus Constr. Co., 2205 Ann Ave., St. Louis, $32,621 and $28,318 respectively. Grand total $308,251. **P.W.A.** Bids Dec. 15. Noted Dec. 4, C.D.—Dec. 10, E.N.-R.

N. Y., Andes—Central School District 2, heating for school, to T. G. Egan Refractory Eng. Co., 70 Kane St., Brooklyn. Noted Dec. 2, C.D.—Dec. 10, E.N.-R., under "Contracts Awarded".

★**N. Y., Flushing**—World's Fair Corp., G. A. Whalen, pres., Flushing Meadows, designs by E. Gugler, 101 Park Ave., New York, and Slee & Bryson, 16 Court St., Brooklyn, constructing business administration building, about 50,000 sq. ft. floor space, $200,000; also designs by F. Keally, 101 Park Ave., New York, and L. Dean, 400 East 58th St., New York, constructing communications building, about 80,000 sq. ft. floor space, $240,000; designs by H. Ellett, 101 Park Ave., New York, exhibitors headquarters building, $90,000.

★**N. Y., Flushing** — G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., constructing asphalt plant (2 unit type) at Flushing River, 2nd Ward, to Woodcrest Constr. Co., 415 Lexington Ave., New York, $598,626. Bids Dec. 15. Noted Dec. 17, C.D. —Dec. 24, E.N.-R.

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†*Federal Government*

Public Buildings (Continued)

N. Y., New York — Dpt. Sanitation, 125 Worth St., 2 story section station and service building, 32 Goerck St., relief day labor, $38,000. Owner will purchase materials. F. B. McDuffee, c/o owner, archt.

N. Y., Odessa—Bd. Educ., general contract sandstone, limestone, brick central school, to J. Dall, 121 East Seneca St., Ithaca, $207,138 ***heating and ventilating, to E. J. Leary, 45 Stanley St., Buffalo, $23,883***plumbing, to Van Patten Plumbing & Heating Co., 111 East Church St., Elmira, $10,792***electrical work, to M. M. Gleason, 239 Water St., Binghamton, $14,880. Grand total $256,693. Subject to **P.W.A.** approval. Bids Dec. 17. Noted Dec. 4, C.D.—Dec. 10, E.N.-R.

O., Cambridge—Dpt. Hy. Dpt., Columbus, general contract constructing patrol barracks, to L. M. Leonard Co., 422 Gay St., $34,896 ***electrical work, to Laurence Electric Co., Zanesville, $1,598 *** plumbing, to Gesling Plumbing Co., Lancaster, $4,175***heating, to Grif. M. Lewis, 176 South Westgate Ave., Columbus, $3,741. Grand total $54,410. Est. $50,000. Bids Dec. 18, Noted Dec. 15, C.D.

O., Galion — Galion Municipal Light & Power Co., installing turbo-generator and auxiliaries, to General Electric Co., 1 River Rd., $71,000; condenser, to Ingersoll Rand Co., Williamson Bldg., Cleveland, $27,940. Noted Dec. 4, C.D.

†**Okla., Anadarko** — Dpt. Interior, Wash., D. C., constructing Riverside School, to Harmon Constr. Co., 601 North Indiana Ave., Oklahoma City, $51,976.

★**Tex., Houston** — City, c/o F. Holcombe, mayor, general contract 1 story convention hall, "Jesse H. Jones Coliseum", Brazos St., to Knutson Constr. Co., Union National Bldg., $827,000***plumbing, heating, ventilating and air conditioning, to W. M. Shivers, 1516 Milby St., $133,652***electrical work, to J. S. Copeland Electric Co., M. and M. Bldg., $69,879. Grand total $1,030,532. Bids July 3. Work started about Dec. 1, foundation nearing completion. Noted July 13, C.D.—June 11, E.N.-R.

†**Va., Tazewell**—Treas. Dpt. at office, Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Safarelli Bros., Post Office Box 88, Jamaica, N. Y., $44,552. Bids Dec. 3. Noted Nov. 10, C.D.—Nov. 19, E.N.-R.

Wis., Marinette—Bd. Educ., general contract Garfield School, 1 and 2 story, 127x200 ft., to A. H. Proksch, Iron River, Mich., $81,605***heating and ventilating, to Stoehr & Landon, Inc., 1705 West Clyborn St., Milwaukee, $13,204 and $6,862 respectively*** electrical work, to Kehl Electric Co., Green Bay, $2,426***hardware, to D. B. Nicholson, Green Bay, $1,083. Grand total $105,180. **P.W.A.** Bids Dec. 15. Noted Dec. 2, C.D.—Dec. 10, E.N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Chico—S. Meline, Durham Rd., plans rein.-con. class A theatre, 1,000 seating capacity, Broadway and 3rd Sts. Architect not appointed.

Calif., Fresno—Scottish Rite, A and A.S.R., plans by F. L. Swartz, Bank Bldg., Fresno and W. D. Coates, Jr., class "A" fireproof construction masonic temple, $150,000 or more. F. W. Kellberg, 320 Market St., San Francisco, engr. Noted Nov. 14, 1935, C.D.—Nov. 21, 1935, E.N.-R.

Calif., Palm Springs—E. J. Welch, and 7 associates, Postal Union Life Insurance Bldg., Hollywood, plans by Walker & Eisen, 708 Pacific Commerce Bldg., Los Angeles, establishing a winter resort at Desert Hot Springs, near here, incl. 200 cottages, commercial buildings and a hotel. To exceed $150,000.

Conn., Bridgeport—Motorways Hotel Co., W. J. Eastman, trustee, 28 Fairfield Ave., abandoned plans for 4 story, 80x160 ft., brick, steel, terra cotta hotel, Water and Fairfield Aves. $250,000. E. B. Caldwell, 1029 Fairfield Ave., archt. Noted May 21, C.D.—May 28, E.N.-R.

Conn., Danbury—Owner, c/o Perry Katz, 237 Main St., Danbury, purchased Frank Hartwell Estate Property and plans 3 story, brick, steel professional building, containing 9 stores on first floor, West St. near Main St. $150,000. Architect not appointed.

★**Ga., Emory University**—Emory University, c/o Dr. Harvey Cox, pres., plans several new buildings for expansion program, approved by Bd. of Directors, building to be brick, stone, marble, rein.-con. and structural steel frame construction. $600,000. Architect not appointed.

Ill., Chicago—Estate of Mark Cummings, c/o Dexter Cummings, 38 South Dearborn St., plans by A. S. Alschuler, Inc., 28 East Jackson Blvd., 2 and 3 story, 80-172 ft., basement, steel, concrete, stone, glass, brick store and garage, Adams St. and Wabash Ave. $200,000.

Ill., Rock Island—Augustana College, Rock Island, soon takes bids by Childs & Smith, 430 North Michigan Ave., Chicago, constructing men's dormitory. To exceed $140,000.

★**Kan., Kansas City**—Southwestern Bell Telephone Co., 324 East 11th St., Kansas City, Mo., making plans new telephone exchange, $1,700,000. Private plans. B. Vaughn, 11 and Oak Sts., Kansas City, Mo., engr.

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Mich., Albion—Albion College, J. L. Seaton, pres., plans by C. Z. Klauder, 1429 Walnut St., Phila., Pa., and F. E. Dean, Albion, 2 story, basement, brick, steel and rein.-con. library building, plain found. College Campus, $250,000.

Mich., Lansing—J. W. Knapp Co., D. M. Shotwell, pres. and genl. mgr., plans by Bowd & Munson, Lansing, new modern department store. Noted Dec. 14, C.D.—Dec. 17, E.N.-R.

N. Y., Brooklyn—H. V. Murphy, archt., 208 Livingston St., bids about Jan. 15, altering heating, plumbing in stores and office, 239 Atlantic Ave., for Catholic Charities, Roman Catholic Diocese of Brooklyn, 66 Boerum Pl. $37,000 with equipment. Noted Nov. 19, C.D. —Nov. 26, E.N.-R.

N. Y., Buffalo—University of Buffalo, 25 Niagara St., plans constructing gymnasium on campus. To exceed $140,000. Green & James, 1 Niagara Sq., archts.

N. Y., Flushing—M. H. R. Realty Corp., c/o P. E. Jackson, 68 Williams St., plans 6 story, 112x180 ft. apartments, Northern Blvd. and Murray St. To exceed $160,000. Site acquired.

N. Y., Hollis—Bennett Shieber, Inc., 163-18 Jamaica Ave., Jamaica, constructing part ments, etc., tract development, Peters Field. To exceed $140,000. **Maturity indefinite.** Architect and engineer not appointed.

N. Y., Ilion—Ilion Community Club, H. Kent, pres., plans hotel. To exceed $140,000. Architect and engineer not appointed.

N. Y., New Castle—Cottage Lane Properties, Inc., New Castle, constructing 35 residences at Seven Bridges Rd. and Lawrence Farms Crossings. To exceed $150,000. Private plans.

N. Y., Jamestown—J. T. Maroney, 532 South Park Ave., Buffalo, plans 2 or 3 story, basement, steel, brick apartment, Prather Ave. $150,000. **Architect not appointed.**

N. Y., New York—Ansonia Hotel Corp., Bway., 73rd and 74th Sts., plans air conditioning hotel. To exceed $200,000.

N. Y., New York—J. F. Belardi, 137 Macdougal St., bids early in January, altering heating, plumbing in apartment, 45 Grove St. $38,000. Minoque & Palmer, 17 East 42nd St., archts.

N. Y., New York—D. K. Realty Corp., P. Krumholz, pres., 735 Mace Ave., plans 6 story apartment, West Park Terrace and 215th St. $150,000 or more. Site acquired.

N. Y., New York—The Medpick Corp., E. A. Sperpick, in charge, plans constructing apartment, 225-239 East 74th St. To exceed $200,000.

N. Y., New York—Olor Corp., 2488 Grand Concourse, plans by C. Kreymborg, 349 East 149th St., 6 story, brick apartment, Clay Ave. and 176th St. Est. about $150,000.

N. Y., New York—Helen L. Sackett, c/o Grace Church Rye, plans by L. and L. Levy, 527 5th Ave., altering heating, plumbing in three 4 story apartments and stores, 1019 3rd Ave. $37,000 with fixtures.

N. Y., New York—Tryon Gardens, Inc., 758 Brady Ave., plans by Sugarman & Berger, 17 East 49th St., 6 story, brick apartment, 470 Bway. $200,000.

N. Y., New York—Vypad Realty Corp., 352 East 141st St., plans by C. Kreymborg, 349 East 149th St., 6 story apartment, North Mosholu Parkway near Kossuth Ave., $80,000; also 6 story apartment, 570 Isham St., $80,000.

N. Y., New York—B. Winter, 51 East 42nd St., plans 2 story store, 32 East 53rd St. Est. about $140,000. Site acquired.

N. Y., Rego Park—Syndicate, c/o F. W. Scutt & Co., 155-03 Jamaica Ave., Jamaica, plans 6 story apartment, 66th Ave. and Booth St. To exceed $200,000. Site acquired.

N. Y., Saratoga Springs—American Community Theatres, Inc., 701 7th Ave., New York, plans by T. W. Lamb, 701 7th Ave., New York, moving picture theatre, Broadway. Est. about $140,000. **Maturity indefinite.**

N. C., Wilmington—James Walker Memorial Hospital, c/o Superintendent of Hospital, soon takes bids 2 story, basement, 40x130 ft. brick, steel, cast stone hospital, concrete found. Est. about $150,000. P.W.A. project. Stevens, Curtin & Mason, 45 Newbury St., Boston, Mass., archts.

Pa., Easton—Lafayette College, Easton, plans new central heating plant, $175,000, and addition to library, $125,000. Arrangements for financing now in progress. Dr. W. Lewis, pres.

Pa., Johnstown—Alfred P. Ellis Estate, Johnstown, plans razing 1 structure and remodeling 1 building and erect modern brick, steel unit, on 2 properties at Main and Franklin Sts. Est. $150,000 or more with equipment. Architect not appointed. F. W. Woolworth Co., Albany, N. Y., lessee.

Pa., Lewiston—Montgomery Ward & Co., West Chicago and North Larrimer St., Chicago, Ill., plans department store. Est. about $150,000.

Pa., Pittsburgh—Arbuckle Estate, c/o George Bros., Peoples Bank Bldg., sketches by R. M. Trimble, Commonwealth Annex, new 2 story, basement, brick, steel, stone, terra cotta trimmed theatre or store and shop building, 800 Liberty St. Estate will put up new building to suit tenant. Pittsburgh Wrecking Co., 4062 Liberty Ave., wrecking present 6 story building.

R. I., Pawtucket—St. Edward Parish plans by J. F. Hogan, 35 Grosvenor Bldg., Providence, 2 story, basement church. Est. about $150,000.

★**Tex., Houston**—River Oaks Corp., H. Potter, pres., River Oaks Blvd., plans by O. C. Winston, Scanlan Bldg., two 2 story brick, steel, rein.-con. store buildings to form a complete one-half circle, West Gray St. at Shepherd St. $250,000. Both buildings will be completely air-conditioned. Above first unit of what is expected ultimately to be a $2,000,000 community project, balance of cost will go for numerous apartment buildings, a theatre, tennis courts, beer garden, landscaping 25 acres which River Oaks Corp. owns, opening and extending streets, laying sidewalks, installing storm and sanitary sewers. Project is backed by Hogg Estate, one of the wealthiest in all of Texas. If the owners desire they can readily carry it out to the fullest extent.

Tex., Laredo—Plaza Hotel, c/o R. E. Morrison, mgr., plans improvements and addition to present 8 story hotel, incl. air conditioning, 2 story upper on top of present 8 story; numerous miscellaneous improvements; overhauling and remodeling present building; electrical, plumbing and heating improvements; excavating for air-conditioned basement; plastering, lathing, painting, decorating, furnishings, etc. $175,000. Private plans. Work now starting in excavating for basement and it is planned to award contracts from time to time for the general contract, sub-contracts, units, furnishings, materials, etc. Interested contractors and manufacturers should communicate with owners direct since there will not be a general advertised call for bids, but probably a private notification to those interested.

BIDS ASKED

Mass., Boston — Old South Church, 645 Boylston St., Professor C. Spofford, chm. Building Comm., 11 Beacon St., taking bids new 225 ft. high tower for church, steel, stone construction, Bolyston St. $150,000. Allen, Collens & Willis, 75 Newbury St., archts.

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Flushing—See "Contracts Awarded."

N. Y., Jackson Heights — See "Contracts Awarded."

N. Y., Long Island City—See "Contracts Awarded."

N. Y., Maspeth—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., San Francisco—Grant Co., 114 Sansome St., 4 story, rein.-con. hotel addition, 386 Geary St., to Lindgren & Swinerton, Inc., 225 Bush St. $150,000 or more, cost plus basis. D. D. Stone, 110 Sutter St., archt.

Calif., San Francisco—Insurance Co. of North America, 231 Sansome St., 6 story, basement, rein.-con. office, Sansome St. near Pine St. to Lindgren & Swinerton, Inc., 225 Bush St., approximately $350,000. H. J. Brunnier, Sharon Bldg., engr. G. W. Kelham, 315 Montgomery St., archt. Noted Nov. 25, C.D.—Dec. 3, E.N.-R.

Ill., Chicago—S. S. Kresge Co., 2727 2nd St., Detroit, Mich., 2 story, 120x150 ft. store, and rebuilding 4 stores at 63rd St. and Halsted St., incl. stainless steel front, to B-W. Constr. Co., 307 North Michigan Ave. Est. $180,000. R. L. Henderson, c/o owner, archt.

Ill., Chicago—Elmwood Park Building Corp., plans by E. P. Rupert, 30 North Dearborn St., theatre and store building, incl. air conditioning, Grand Ave. $150,000.

Ill., Chicago—Esquire Theatre Corp., 58 South Oak St., plans by Pereira & Pereira, 333 North Michigan Ave., and takes bids in January on general contract theatre, East Oak St. To exceed $140,000. Excavation awarded to Paschen Bros., 33 North LaSalle St.

Ill., Evanston—J. M. Smyth Co., 703 West Madison St., plans furniture store, Benson and Church Sts. To exceed $140,000.

Mass., Malden—L. Friedman, 1540 Broadway, New York, takes bids in February or later, theatre. $140,000. T. W. Lamb, 701-7th Ave., New York, archts. Noted July 13, C.D.—July 16, E.N.-R.

Mich., Highland Park—Detroit Osteopathic Hospital, Highland Park, 3 story, basement, brick, stone, steel, concrete hospital unit, to W. E. Wood Co., 4649 Humbolt Ave., Detroit, Mich. Est. $150,000. Bennett & Straight, 201 Schaefer Bldg., Dearborn, archt. Noted Nov. 23, C.D.—Nov. 26, E.N.R., under "Public Buildings."

N. J., Tenafly—Clinton Towers Constr. Co., B. Cohn, pres., plans 20 houses averaging $15,000 each on 5 acre plot recently acquired, development to be called "Stonehurst." **Maturity at once.**

N. Y., Brooklyn—Remsen Homes, Inc., G. McPherson, pres., 2047 Nostrand Ave., constructing 6 story apartment, 142 Remsen St.,

†*Federal Government*

Commercial Buildings (Continued)

separate contracts now being awarded. $140,000. O. Silverstone, 153 Pierrepont St., archt.

★**N. Y., Brooklyn**—Rinzler & Frisch, 1515 Bedford Ave., constructing theatre, Mesrole St. and Graham Ave., to Herman Weingarten & P. Greenbaum, 441 Avenue P or c/o owner. Est. $500,000. Site acquired. C. A. Sandbloom, 145 West 45th St., New York, archt.

N. Y., Brooklyn—Abramham & Strauss, 422 Fulton St., constructing store, 406 Fulton St., to John Thatcher & Son, 60 Park Ave. Est. $225,000. Noted Dec. 10, C.D.—Dec. 17, E.N.-R.

N. Y., Brooklyn—Corporation, c/o T. Cohen, 42 Bway., New York, constructing group dwellings, Bay 37th St., day labor. $140,000. J. E. Schnall, 44 Court St., archt. Owner will purchase materials.

N. Y., Brooklyn—Corporation, c/o J. Dorment, 66 Court St., constructing group dwellings with garages, Avenue T, 34th and 33rd Sts., day labor and separate contracts. $140,000. Noted Sept. 10, C.D.—Sept. 17, E.N.-R.

N. Y., Brooklyn—Corporation, c/o S. Ferrante, 1581 Hendrickson St., constructing group dwellings, 569 East 55th St., day labor. $140,000. R. T. Schaefer, 2176 Nostrand Ave., archt.

N. Y., Flushing—Philbrook Realty Corp., 26 Court St., 6 story, brick apartment, Crochern Ave. and 167th St., separate contracts. $185,000. J. J. Millman, 184 Joralemon St., Brooklyn, archt. Noted Nov. 23, C.D.—Nov. 26, E.N.-R.

N. Y., Jackson Heights—Appealing Homes, Inc., 40-09 82nd St., constructing group 1 story, brick dwellings, 82nd St. and 25th Ave., day labor. $140,000. A. E. Allen, Garden City, archt. Owner will purchase materials.

N. Y., Jackson Heights—Triborough Bridge Building Corp., 160-16 Jamaica Ave., Jamaica, group 2 story dwellings, 31st Ave. and 89th St., day labor. $140,000. Owner will purchase materials. A. E. Allen, Garden City, archt.

N. Y., Jamaica—Oceanside Realty Corp., 191 Joralemon St., Brooklyn, plans by J. Tabatchnik, 1838 West 5th St., Brooklyn, 6 story apartment, 161st St. and 89th Ave. $280,000.

N. Y., Jamaica—L. I. Siegel, 94-35 119th St., Richmond Hill, plans by W. Sambur, 162-02 Jamaica Ave., 5 story apartment, 162nd St. and Hillside Ave. $140,000.

N. Y., Kew Gardens—S. Cohn, 240 East 21st St., Brooklyn, plans by B. Braunstein, 163-18 Jamaica Ave., 6 story apartment, Park Lane South and Metropolitan Ave. $350,000.

N. Y., Long Island City—Island Realty Corp., 155-22 Jamaica Ave., Jamaica, group 2 story, brick dwellings, 20th Ave. and 43rd St., day labor. $140,000. Owner will purchase materials. A. E. Allen, Garden City, archt.

N. Y., Maspeth—Hyatt Realties, Inc., 53-01 65th Pl., group 2 story, brick dwellings, 53rd Dr. and 63rd St., day labor. $140,000. B. Driesler, Jr., 163 Remsen St., Brooklyn, archt.

N. Y., New York—Metco Realty Corp., 11 West 42nd St., altering heating, plumbing in 5 story apartment, 310 East 25th St., separate contracts. $38,000 with fixtures. P. Birnbaum, c/o owner, archt. Noted Nov. 24, C.D.—Dec. 3 E.N.-R.

N. Y., New York—Corporation, c/o L. Foster, 35 West 177th St., plans by E. K. Herzog, 140 West 42nd St., 6 story apartment, 175th St. and Popham Ave. $140,000.

N. Y., New York—Dorsay Realty Corp., G. R. Bregman, 170 Bway., plans 6 story apartment, 201st St. and Valentine Ave. To exceed $150,000. Site acquired.

★**N. Y., New York**—Eight Hundred Thirty-One Gerard Avenue Corp., 1791 Grand Concourse, plans by H. H. Lillen, 125 East 149th St., 9 story apartment, 158th St. and Gerard Ave. $500,000.

N. Y., New York—H. Levine, 332 East 149th St., plans by I. L. Crausman, 332 East 149th St., 6 story apartment, 171st St. and College Ave. $150,000.

N. Y., New York—P. and A. D. Rubin, Inc., c/o P. Rubin, 391 East 149th St., plans constructing 6 story store and apartment, East 161st St. and Grand Concourse. $140,000 or more. Site acquired.

N. Y., New York—Record Realty Construction Corp., c/o J. Spallone, 2981 Anthony Ave., 6 story apartment, 239 East Tremont Ave. $140,000. Site acquired.

N. C., Raleigh—North Carolina Theatres, Inc., W. G. Enloe, mgr., Raleigh Theater, general contract theatre, Fayetteville St., to F. N. Thompson, 323 South Church St., Charlotte, and Capital Club Bldg., Raleigh*** electrical work to Neiman Electrical Co., Asheville***plumbing and heating, to Pace Plumbing Co., Hendersonville. Est. $250,000. E. G. Stillwell, Hendersonville, archt. Noted Dec. 7, C.D.—Dec. 10, E.N.-R.

O., Cincinnati—Proctor & Gamble Co., 6th and Main Sts., air conditioning offices, to Carrier Eng. Co., 850 Frelinghuysen Ave., Newark, N.J. Est. $40,000.

O., Cleveland—Rocky River Development Co., A. F. Ptak, pres., c/o Lyceum Theatre, West 41st St., 1 story, basement commercial building and theatre, 19310 Detroit Rd., to Nicholas Pavle, 10518 Joan Ave. Est. $200,000. W. S. Ferguson, 3030 Euclid Ave., archt.

Pa., Harrisburg — Payne Shoemaker Co., Third and Pine Sts., 12 story, brick office building, to S. W. Shoemaker & Sons, Harrisburg. Est. $450,000. Excavation just about completed. W. L. Murray, 1019 North 15th St., archt.

Tex., Austin — Affiliated National Hotels, c/o J. B. Miles, mgr., Austin, plans by A. Frazier, American National Life Ins. Bldg., Galveston, and soon takes bids 6 story addition to present 10 story Stephen F. Austin Hotel, Cong. Ave. and 7th St. $375,000.

N. B., Balmoral—Roman Catholic Parish of Balmoral, plans constructing steel, stone church. $150,000. **Maturity in spring.** Architect not appointed.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ark., Paragould — FACTORY — Chamber of Commerce, Mrs. B. H. Wall, secy., and Ely & Walker Dry Goods Co., 1520 Washington Ave., St. Louis, Mo., plans by A. N. McAninch, Pyramid Life Bldg., Little Rock, 1 story, 270x300 ft., concrete, steel shirt factory, equipped with sprinkler and heating system. Maturity early in 1937 and will not take bids from contractors. Noted Dec. 10, C.D.—Dec. 17, E.N.-R.

★**Calif., Los Angeles** — PLANT — Pioneer-Flintkote Co., 5500 South Alameda St., plans by E. C. Taylor, 803 West 3rd St., plant. $1,000,000. Noted Oct. 22, C.D.—Oct. 29, E.N.-R.

Calif., Woodland — GARAGE—L. Skaggs, Woodland, plans by W. E. Coffman, Forum Bldg., Sacramento, 90x90 ft., wood frame, brick, steel sash garage.

Conn., Bridgeport—BUS TERMINAL—Penn-Haven Terminal Co., W. J. Eastman, 28 Fairfield Ave., will not construct 2 story, 76x77 ft., brick, steel bus terminal, Water St. $50,000. Project abandoned. Noted Apr. 14, C.D.—Apr. 16, E.N.-R.

Del., Seaford — MILLS—Seaford Hosiery Mills, Inc., West Seaford, soon lets contract 80x100 ft., brick, steel and glass mills at West Seaford. $40,000 or more.

Ga., Columbus—PLANT IMPROVEMENTS—Nehi, Inc., Columbus, 1000 9th Ave., plans by T. Firth Lockwood, Murrah Bldg., plant improvements. $100,000.

Ill., Chicago — DAIRY PLANT — Ogden Dairy Co., 4341 West Ogden Ave., plans 2 story, dairy plant addition, Ogden Ave. $40,000 with equipment.

Ill., Chicago — FACTORY — Chicago Pump Co., 2336 West Wolfram St., plans 2 story, partial basement, factory addition, Wolfram St. To exceed $37,000.

Ind., Evansville—FACTORY—Klamer-Goeblet Furniture Co., 1511 North Garvin St., plans constructing factory. To exceed $45,000. **Maturity indefinite.** Architect not appointed.

★**Md., Baltimore**—PLANT IMPROVEMENTS—Rustless Iron Corp., C. E. Tuttle, pres., 1007 Edison Hy., plans plant improvements, incl. new 12 in. merchant bar mill and additional capacity in melting and cold finishing. Est. $625,000.

Md., Curtis Bay (sta. Baltimore)—PLANT—U. S. Industrial Alcohol Co., 60 East 42nd St., New York, plans 2 story plant addition. $37,000 or more.

Mass., Cambridge—LABORATORY—Boston Blacking & Chemical Co., Kendall Sq., sketches by Coolidge, Shepley, Bullfinch & Abbott, 1 Court St., Boston, Laboratory and office, Kendall Sq. To exceed $40,000.

Mass., Worcester—SUPER-SERVICE STATION—Atlantic Refining Co., North and Prescott Sts., soon lets contract, brick super-service station, concrete found., incl. heating, plumbing, electric, pumps, tanks, pipe lines, grease pits, driveways, etc. Main and Curtis Sts. Private plans.

Mich., Grayling—MEAT PACKING PLANT—Schweitzer & Co., Grayling, plans meat packing plant. $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

★**Mich., Jackson** — FACTORY — Goodyear Tire & Rubber Co., C. Slosser, vice-pres., 1144 East Market St., Akron, O., purchase site, present buildings being razed, and preparing plans 1 to 4 story, brick, rein.-con., steel tire manufacturing plant, plain found. To exceed $1,000,000. Noted Dec. 15, C.D.—Dec. 17, E.N.-R.

Minn., Duluth — PLANT — Interlake Iron Corp., Duluth, plans plant additions and improvements. $37,000 or more.

Neb., Grand Island — WAREHOUSE — Western States Grocery Co., Div. Office, C. C. Carpenter, dist. supt., 2029 Wyandotte St., Kansas City, Mo., plans brick warehouse. $38,000. Private plans.

N. Y., Brooklyn—GARAGE, etc.—W. Feldstein, 295 Central Ave., Lawrence, plans by J. Berlinger, 17 East 49th St., New York, 1 story, brick, garage and storage, 1 Ocean Parkway. $85,000.

N. Y., Brooklyn—FIRE ALARM OPERATING STATION—Consolidated Fire Alarm Co., 276 5th Ave., New York, plans by L. Lauritzen, 57 Willoughby St., 2 story, 40x40 ft. brick, fire alarm building, Tillary and Lawrence Sts. $37,000 with equipment.

N. Y., Brooklyn—WAREHOUSE—Brooklyn Waterfront Terminal Corp., 99 Wall St., New York, postponed taking of bids until after June 1, altering storage and warehouse, 58-70 19th St. $37,000. H. H. Johnston, 2410 Avenue S, archt. Noted Oct. 23, C.D.—Oct. 29, E.N.-R.

N. Y., Buffalo—WAREHOUSE—Bishop Co., Inc., 263 Scott St., plans by H. E. Plumer & Associates, archts. and engrs., 775 Main St., constructing 3 story, 100x150 ft., brick, concrete warehouse, plain found. Bailey Ave. $125,000.

★**N. Y., Buffalo**—COKE OVENS—Hanna Furnace Corp., subsidiary National Steel Co., Tecumseh Ecorse, Detroit, Mich., plans constructing battery of coke ovens at Fuhrmann Dr. $6,000,000. **Maturity soon.**

N. Y., Buffalo—GARAGE, etc.—F. E. Van Tilburg, 144 Capen Blvd., soon takes bids constructing 1 story, basement, 120x125 ft., brick, steel, garage, plain found., 3464 Main St. $40,000. Private plans.

N. Y., Buffalo—WAREHOUSE—Cuff Packing & Provision Co., 1961 William St., plans reconstructing warehouse, 1961 William St., destroyed by fire. $40,000. Architect and engineer not appointed.

N. Y., Maspeth — PLANT STORAGE — National Can Co., 5208 Grand St., plans by R. Garland, c/o owner, 3 story, plant storage, 5208 Grand St. $150,000.

N. Y., Medina—FACTORY—H. J. Heinz Co., 1602 Progress St., plans by A. Kahn, Inc., archts. and engrs., New Center Bldg., Detroit, Mich., and takes bids early in 1937, 3 story, basement, 160x340 ft. factory, 622 Genesee St. To exceed $150,000. Noted Dec. 14, C.D.—Dec. 17, E.N.-R.

N. Y., New York—FACTORY, etc.—M. R. Spear, 225 5th Ave., plans by T. R. Deinberg, 1141 Bway., altering 6 story, factory and storage building, 675 6th Ave. $90,000.

N. Y., New York—GARAGE, etc.—Emigrant Industrial Savings Bank, 51 Chambers St., plans by Voorhees, Gmelin & Walker, 101 Park Ave., 2 story garage and service station, 200 West 20th St. Est. about $40,000.

N. Y., New York—MACHINE SHOP—Steinmetz Realty Co., 565 5th Ave., plans by Moore & Landsiedel, 148th St. and 3rd Ave., 1 story, 50x100 ft., machine shop, 581 11th Ave. Est. about $37,000 with equipment.

N. Y., New York—SHOP, etc.—Arkans, Inc., 570 Lexington Ave., plans by J. Mitchell, c/o owner, 1 story, 100x150 ft. shop and garage, 606 West 30th St. $38,000 with equipment.

N. Y., New York—STORAGE, etc.—G. H. Storm, 2510 Park Ave., plans constructing storage and warehouse additions and extensions, 135th St. and Park Ave. To exceed $37,000. Central Foundry Co., 420 Lexington Ave., lessee.

N. Y., Yonkers—FACTORY—Peoples Savings Bank, plans renovating and remodeling large building, 49 Buena Vista and former Eagles Hall, 93 Elm St., to be used for light manufacturing. $140,000. W. R. Jackson, c/o owners, in charge.

N. C., Asheville — FACTORY — Ivey's, Inc., Asheville, plans by E. Paul Behles, 12 West Madison St., Baltimore, Md., remodeling factory building, incl. installing new equipment. $175,000.

N. C., Plymouth—PLANT—C. C. Lang Co., J. Bateman, mgr., plans 75x103 ft., cucumber plant and salt house, 75 tanks, 8 ft. high, 12 in. in diam., Brinkley Ave. To exceed $37,000.

O., Cincinnati—POWER PLANT—See "Contracts Awarded."

O., Galion — PLANT — Perfection Burial Vault Co. plans replacing burned plant. To exceed $100,000. Loss about $500,000. **Maturity indefinite.** Architect not appointed.

O., New Comerstown — FACTORY — Heller Bros. Co. plans 1 story, 21,000 sq. ft. floor space, modern brick, steel factory building. $40,000-$50,000. Private plans.

Pa., Erie—STOCKHOUSE—Wayne Brewing Co., C. H. Kessler, pres., 1701 Parade St., plans by Myers & Johnson, 821 Commerce Bldg., 1 story, 30x40x47 ft., brick, steel, tile stock house for beer, 17th and Parade Sts.

★**Pa., Phila.**—POWER PLANT MODERNIZATION—Philadelphia Electric Co., 1,000 Chestnut St., (subsidiary United Gas Impvt. Co.), plans modernizing steam electric power plant, Schuylkill Station. $5,000,000.

Pa., Pittsburgh — ADMINISTRATION — H. J. Heinz Co., C. R. Mitchell, asst. genl. mgr., Progress St., N. S., plans nearing completion by Albert Kahn, Inc., 345 New Center Bldg., Detroit, Mich., 5 story, brick, steel administration building, Progress St.

Pa., Pittsville — PLANT — H. L. Miller & Sons, Fort Carbon, new bids in spring, brick, steel, concrete bleaching-dye plant. **W. J. Senner, 529 Court St., Reading, engr.**

S. C., Greenville — BUS TERMINAL — Atlantic Greyhound Lines, plans by H. I. Gaines, Asheville, N. C., bus terminal. $150,000.

†*Federal Government*

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Industrial Buildings (Continued)

Tenn., Lewisburg—PLANT—Marshall Stove Works Lewisburg, plans rebuilding plant, destroyed by fire. To exceed $37,000. Fire loss $200,000. Architect not appointed.

Tex., Athens—CANNING PLANT—Bluebird Food Products Corp., plans canning plant. $75,000. Private plans.

★**Tex., Houston** — PLANT — American Can Co., 230 Park Ave., New York, soon takes bids can manufacturing plant addition. $1,500,000. Noted July 1, C.D.—July 9, E.N.-R.

Tex., Wichita Falls — PLANT — Southwest Feed Mills, plans plant and storage. $40,000. **Maturity indefinite.** Architect not appointed.

Wash., Puyallup—LUMBER MILL—Brew Mfg. Co., plans rebuilding planing and lumber mill. $37,000 with equipment. Engineer and architect not appointed. Work will probably be handled by force account.

Wis., Cudahy—FACTORY—Solar Corp., 3362 East Layton Ave., plans by Robert H. Smith, engr., 5920 West North Ave., Milwaukee, 6 story, 80x157 ft., brick, steel factory, plain found.

Wis., Rio Creek—BULK PLANT—Barnsdall Oil Co., 1229 South 41st St., plans by A. Johnson, 1229 South 41st St., 1 story, steel oil bulk plant building, incl. 2 vertical tanks, 12,000 gal. capacity, and 1 vertical tank 17,000 gal. capacity.

B. C., Vancouver—FACTORY—Ford Motor Co. of Canada, 1160 Hamilton St., plans 1 story, 232x240 ft., brick, steel new assembly plant Kingsway St. $400,000. Private plans. **Maturity in spring.**

Ont., Simcoe—PLANT—American Can Co., Ltd., Simcoe, and 230 Park Ave., New York, plans plant addition and improvements. $50,000.

Philipine Islands, Tanato — PUMP MILL — Warner Bros. & Co., Ltd., London, England, making plans pump mill. $1,000,000.

BIDS ASKED

Calif., Santa Monica—GARAGE, STORAGE, etc.—H. A. Klabunde, archt. and H. P. King, engr., both of 105 Broadway, taking bids from selected list of contractors. 1 story, 188x400 ft., brick, garage, warehouse and office building, Lincoln Blvd., for Roberts Public Markets, 209 Colorado St. Noted Nov. 10, C.D.—Nov. 19, E.N.-R.

Ky., Louisville — BREWERY — See "Contracts Awarded."

La., Shreveport—PLANT—Continental Baking Co., 630 5th Ave., New York, taking bids modernizing and constructing addition to baking plant. Est. about $45,000.

Me., Richmond — SUPER-SERVICE STATION—Socony-Vacuum Oil Co., 31 St. James Ave., Boston, Mass., taking bids 1 story, irregular sized, brick, steel, super-service station, concrete found., Main and Pleasant Sts., incl. heating, plumbing, electrical work, pumps, tanks, pipe lines, grease pits, driveways, etc. Private plans.

Mass., Ashland — FACTORY, etc. — Fay, Spofford & Thorndike, engrs., 11 Beacon St., Boston, taking bids 1 and 2 story, basement, irregular sized, brick, concrete, steel factory and office building, concrete found., for Warren Telachron Co., Ashland. $200,000.

Mass., Lawrence — SUPER-SERVICE STATION—Kelley's Motor Service, P. Kelley, in charge, 316 Common St., Lawrence, taking bids and open same about Dec. 28. 1 story, irregular sized, steel, concrete super-service station, concrete found., incl. heating, plumbing, electrical work, tanks, pipe lines, grease pits, driveways, and equipment, Amesbury and Valley Sts. Private plans.

Mass., Waltham — SUPER-SERVICE STATION—Socony Vacuum Oil Co., 31 St. James Ave., Boston, taking bids 1 story, brick, steel, concrete found., incl. heating, plumbing, electrical work, pumps, tanks, pipe lines, grease pits, driveways, Main and Ellison Sts. Private plans.

Mass., Worcester — PLANT — Lyons Bros. Corp., 31 Mulberry St., taking bids altering brick, steel building for new malt house, Mulberry St. $65,000. E. Hartmann, North Middleboro, archt.

N. H., Dover—SUPER-SERVICE STATION—Jenney Mfg. Co., 12 India St., Boston, Mass., taking bids brick super-service station, concrete found., incl. heating, plumbing, electric, tanks, pumps, pipe lines, grease pits, driveways, etc. Private plans, Mr. Gott, constr. engr.

N. Y., Brighton—ICE CREAM PLANT—J. G. Case, 76 Lozier St., Rochester, taking bids constructing ice cream plant, Monroe Ave. To exceed $40,000. Gustke & Ploch, 130 East Main St., Rochester, archts. Noted Dec. 14, C.D.—Dec. 17, E.N.-R.

N. Y., Brooklyn—MARKET—See "Contracts Awarded."

N. Y., Buffalo—PLANT—J. Schultz & Son, archts., 1370 Main St., taking bids constructing plant addition, incl. plumbing, electrical work, refrigeration for cold storage building, wash room and racking room. Emslie St., for Phoenix Brewery Corp., 390 Emslie St. To exceed $37,000.

N. Y., New York—GARAGE and SHOP—Fifth Avenue Corp., 605 West 132nd St., indefinitely postponed taking bids 3 story garage and shop, 1480 Madison Ave. $70,000. F. Seamon, 140 Cedar St., archt. Noted Aug. 5, C.D.—Aug. 13, E.N.-R.

N. Y., Utica—STORAGE, etc.—Utica Gas & Auto Parts Corp., 410 Main St., bids about Dec. 26, 3 story, 25x125 ft. storage and refrigeration, plain found., 407 Main St. $40,000. Private plans. Wilson & Co., 427 Main St., lessee, will purchase refrigeration equipment.

N. Y., Williamsville—DAIRY—A. E. Landel, Williamsville Dairy, Main St., taking bids on plumbing, heating, electric work for dairy, 5516 Main St. $40,000. R. A. Hill, 132 Shoshone Ave., Buffalo, archt. Noted Nov. 25, C.D.—Dec. 3, E.N.-R.

R. I., Providence—FRUIT PRODUCE—G. F. Chiaverini, archt., 32 Broadway, taking bids 1 story, basement, 27x271 ft., brick, rein.-con., steel fruit produce building, concrete found., Hemlock and Valley Sts., for Governor Dyer Co-operative Market, Inc., c/o Architect. $50,000. Noted Feb. 7, C.D.—Feb. 13, E.N.-R.

Tex., Ft. Stockton—GARAGE—E. Boatman, Ft. Stockton, taking bids 1 story, 100x128 ft., concrete, steel I-beam, garage, concrete found. Will also purchase and install some equipment for general auto and machinery repairing.

Va., Richmond—WAREHOUSE—Jan. 4, by G. M. Bowers, dir. Dpt. P. Wks., constructing 2 story, 75x130 ft. steel, concrete warehouse with corrugated aluminum siding.

Tex., Pharr—PLANT—F. D. McLain & Co., c/o F. D. McLain, RFD, Mission, taking bids 1 story, 50x50 ft., brick, hollow tile, stucco, cold storage plant. W. C. Keller, Pharr, engr.

CONTRACTS AWARDED

Calif., Burbank—FACTORY—Lockheed Aircraft Corp., erecting 2 factory buildings, part of group of 5 buildings, consisting of a press building and an office building, power plant and 2 assembly buildings. Victory Pl. and Empire Ave., to J. V. McNeil Co., 5860 Avalon Blvd., Los Angeles. Work on 2 of buildings one to cover 50x220 ft. and other 75x140 ft. to have concrete founds. and floors, structural steel frames, steel roof trusses, etc., have been started, and estimated cost of same $45,000. Parkinson & Parkinson, 800 Title Insurance Bldg., Los Angeles, archts.

Conn., Danbury—FACTORY—George Hannan Fur Co., 27 Pahquoique Ave., general contract 2 story, 62x104 ft., brick, timber fur factory, Taylor St., to B. J. Dolan, Greenwood Ave., Bethel. Est. $37,000. Noted Dec. 3, C.D.—Dec. 10, E.N.-R.

★**Conn., Hartford**—POWER PLANT—Hartford Electric Light Co., 266 Pearl St., brick, steel, stone, power plant extension, 40,000 kw. turbine generator unit, South Meadow Dist., to Stone & Webster Eng. Corp., 90 Broad St., Boston Mass., $3,250,000.

Conn., New Haven—WAREHOUSE—Moran & Patton, Cedar St., rebuilding brick, steel warehouse, Cedar St., destroyed by fire, to C. W. Murdock, Inc., 505 Grand Ave. $40,000. Schilling & Goldbecker, 51 Elm St., archts.

★**Fla., Fernandina**—MILL—Container Corp. of America, 111 West Washington St., Chicago, Ill., 1st unit of new pulp and paper mill, to Merritt-Chapman & Scott Corp., 17 Battery Pl., New York. Est. $3,000,000. Total est. $7,000,000. Noted June 22, C.D.—June 25, E.N.-R.

Ill., Chicago — FACTORY — Caspers Tin Plate Co., 4100 West 42nd Pl., general contract 2 story, 234x338 ft. factory addition, 42nd St., to Poirot Constr. Co., 2001 West Pershing Rd. General contractor let roofing contract to Olson Hardy Co., 6317 South Carpenter St.***skylights, to Vent-O-Lite Co., 4230 West Taylor St.***sheet metal, to Lionel Vallas Co., 2850 West Lake St. Est. $350,000.

Ill., Chicago — SUB-STATION — Commonwealth Edison Co., 72 West Adams St., general contract 65x90 ft. brick, steel electric sub-station, Cermak Rd., to J. Griffiths & Sons, 228 North LaSalle St. Est. $150,000.

Ill., North Chicago — RESEARCH — Abbott Laboratories, North Chicago, brick, steel, terra cotta, research laboratory, 14th St., to W. E. O'Neil Constr. Co., 2751 North Clybourn St., Chicago. Est. $40,000. Private plans.

Ill., Rockford—PLANT—J. L. Clark [illegible] Co., 900 23rd Ave., general contract [illegible] unit) 125x125 ft. factory addition, Cathe[illegible] St., to Security Building Co., 717 East [illegible] ferson St. Est. $200,000. Noted Nov. C.D.—Nov. 12, E.N.-R.

Ia., Davenport—BAKERY PLANT—H. [illegible] Lemar & P. F. Peterson, 12th and Jack[illegible] Sts., Omaha, Neb., general contract ba[illegible] plant, to John Soller, Davenport, about $[illegible] 000. W. E. Long, 155 North Clark St., C[illegible] cago, Ill., archt. Noted Nov. 27, C.D.—D[illegible] 3, E.N.-R.

Ky., Louisville — BREWERY — Falls C[illegible] Brewery Co., C. W. Bornwasser, pres., 20[illegible] St. and Bway., constructing brewery a[illegible] tion, incl. removal of some inside partiti[illegible] walls and tiling of all walls in plant, givi[illegible] inside and outside walls a new appearan[illegible] constructing malt bins, of 26,000 bush[illegible] capacity, constructing storage cellar on [illegible] floor, and 23x100 ft. room on 5th floor, ro[illegible] of which is to be glass. Small individu[illegible] contracts let, and most of work is bei[illegible] done by day labor under supervision [illegible] owner's foreman. Est. $100,000. W. [illegible] Wakner, Breslin Bldg., archt.

Md., Baltimore — FACTORY — G. [illegible] Mahoney, Knickerbocker Bldg., factory, 1-[illegible] South Kresson Ct., to Hetherington & Berne[illegible] Inc., 702 Kentucky Ave., Indianapolis, Ind., $65,000. Private plans.

N. Y., Brewster—GARAGE, etc.—Brewlee Corp., 8th Ave. and 44th St., 3 story garag[illegible] and office building, Main St., to G. Richard Davis, 21 Mamaroneck Ave., White Plains. Est. $150,000. Contractor taking bids on sub[illegible] contracts. E. M. Gilbert Eng Corp., 41[illegible] Washington St., Reading, Pa., archts. New York State Electric & Gas Corp., Brewster, lessee.

N. Y., Brooklyn—MARKET—Corporation, c/o D. Dienenstock, 44 Court St., constructing market, 6214-11th Ave., separate contracts. $75,000. Shampan & Shampan, 26 Court St., archts.

N. Y., Buffalo—STORAGE, etc.—Truman Realty Co., Genesee Bldg., constructing storage building and store, 3141 Bailey Ave., to G. W. Walker, 1770 Elmwood Ave. Est. about $40,000. L. Greenstein, Prudential Bldg., archt. Owner soon takes bids on plumbing, heating and electrical work.

N. Y., Niagara Falls — PLANT — Niacet Chemical Corp., Pine Ave. and 47th St., plant addition. Union St., to Wright & Kremmers, Inc., Pine Ave. and Main St. Est. $40,000 site equipment. Private plans.

N. Y., Perry—PLANT—Monarch Tank & Metal Fabricating Corp., Lackawanna, constructing fabricating plant, to Potter De Witt Corp., Pavilion. Est. $40,000 with equipment. Private plans.

O., Cincinnati — POWER PLANT — Union Gas & Electric Co., 4th and Main St., condenser well, piers, caissons and tunnel for power building, Columbia Park, to H. J. Deutschbein Co., 350 5th Ave., New York*** condensor and pump, to Worthington Co., 401 Worthington Ave., Harrison, N.J.*** boiler, to Babcock & Wilcox, 85 Liberty St., New York***turbine, to General Electric Co., 570 Lexington Ave., New York. Plans now being prepared for superstructure. Noted Feb. 13, C.D.—Feb. 20, E.N.-R.

O., Cleveland — STORAGE — Brewing Corporation of America, E. P. Taylor, pres., 9400 Quincy Ave., 4 story, basement, storage building, 9400 Quincy Ave., to S. W. Emerson Co., 1836 Euclid Ave. Est. $200,000. E. McGeorge, 1900 Euclid Ave., archt. Noted Dec. 1, C.D.—Dec. 3, E.N.-R.

O., Wellsville — FACTORY — Sterling China Co., 2 story, 45x85 ft., frame, brick factory unit to have 24x46 ft. wing, to D. F. Nellis & Sons Co., East Liverpool, $43,000.

Pa., Williamsport — PACKING PLANT — Swift & Co., H. Millington, local mgr., West 4th and Hepburn Sts., branch meat packing plant and warehouse, Locust and Lycoming Sts., to Jacob Gehron Co., Inc., 607 Cemetery St. Est. $100,000. Bids taken about Oct. 26 awarded about Dec. 17. Noted Oct. 21, C.D.—Oct. 29, E.N.-R.

★**Va., Franklin**—BOARD and PULP MILL—Chesapeake Camp Corp., J. L. Camp, pres., pulp and board mill, to Rust Eng. Co., Clark Bldg., Pittsburgh, Pa. Est. $3,500,000.

W. Va., Huntington—ENGINEERING BUILDING—Owens-Illinois Glass Co., Ohio Bldg., Toledo, O., 2 story, 50x140 ft., glass brick, new engine building at plant, West Fifth St., to Hughes-Foulkrod Co., Schaff Bldg., Phila., Pa. $50,000.

Wis., Milwaukee—STORAGE, etc.—National Ice & Coal Co., 7725 West National Ave., general contract 2 story, 88x159 ft. manufacturing and storage building, South 3rd St., to Selzer-Ornst Co., 6222 West State St., Wauwatosa. Est. $100,000.

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†*Federal Government*

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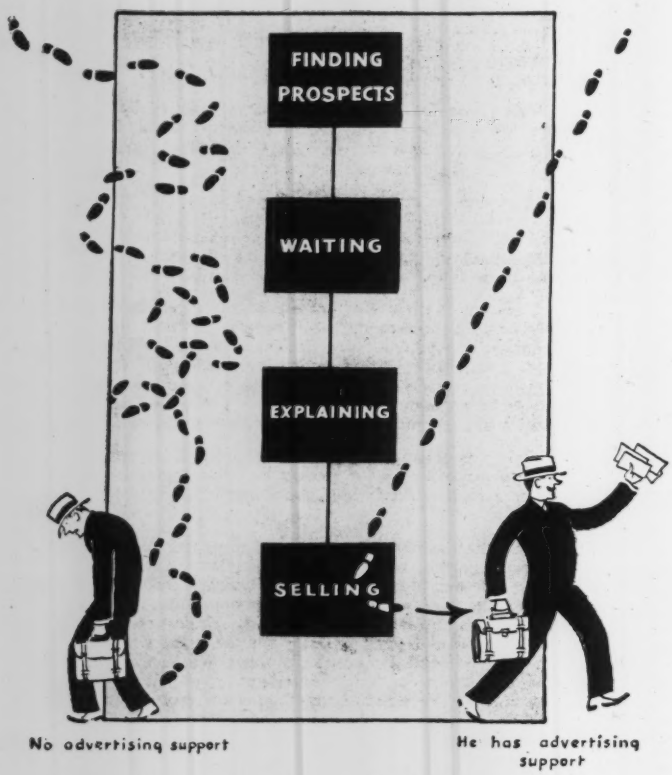

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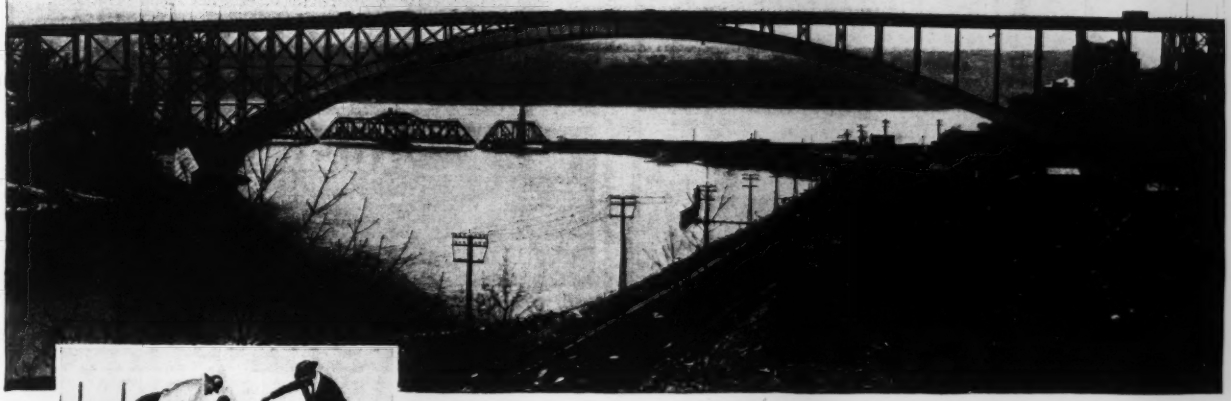


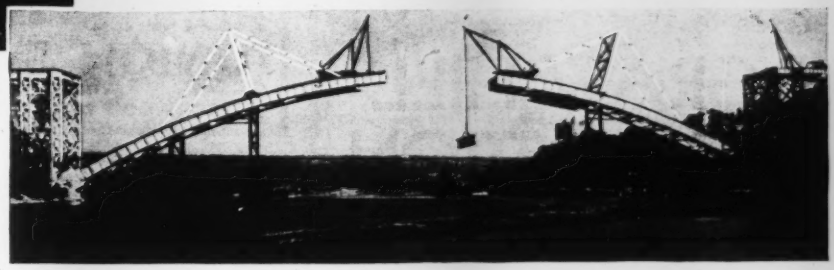
Built for the Henry Hudson Parkway Authority. Madigan & Hyland, Consulting and Supervising Engineers. Robinson & Steinman, Consulting Engineers on Design. Aymar Embury II, Consulting Architect.

YOU can now drive up Riverside Drive on the west side of Manhattan and pass over this bridge, across the Harlem River at Spuyten Duyvil, to go northward on state highways into Westchester County.

Of particular interest in this 1530 ft. structure is the 800 ft. hingeless arch, the world's longest, spanning the New York Central tracks and the Harlem River, a testimonial to practically perfect fabrication and erection; requirements of major importance in arch structures of this type. Each arch rib, of silicon steel, consists of box girders 12½ ft. deep spaced 50 ft. on centers. The roadway deck is supported on spandrel columns and carries a 42 ft. road and 4 ft. sidewalk. On each end is a viaduct approach 365 ft. long.

All structural steel on this bridge was fabricated by American Bridge Company from structural shapes rolled by Carnegie-Illinois Steel Corporation. The superstructure including the roadway was erected by American Bridge Company.

Opening at the crown, controlled by jacks, ready for the insertion of the 2 ft. 6 in. "keystone" piece which closed the arch



The Palisades of the Hudson in the distance set off this huge hingeless arch as it nears completion. Temporary toggles were utilized for the cantilever erection of the center 420 feet of the arch.

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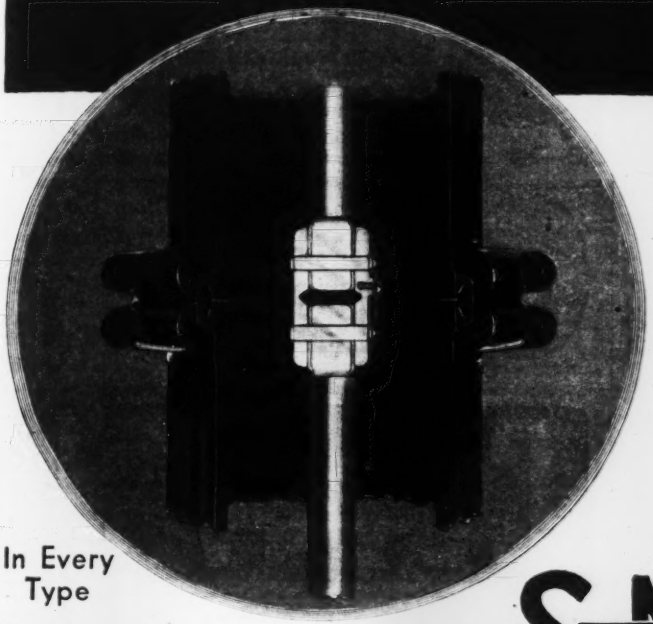

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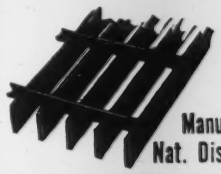

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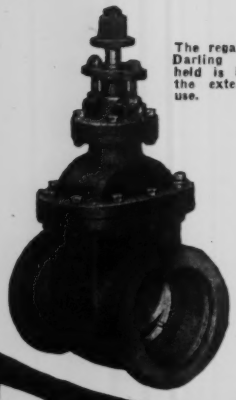

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OFFICIAL PROPOSALS

(Continued from page 38)

OFFICIAL PROPOSALS

Bids: January 19.

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS, ALBANY, N. Y.

Sealed proposals will be received by the undersigned at the State Office Building, 13th Floor, Albany, N. Y., until one o'clock p.m. on TUESDAY, JANUARY 19, 1937, for the construction and reconstruction of highways and bridges in the following counties, in accordance with the rules and regulations for carrying out the provisions of the Emergency Relief Appropriation Act of 1935 (Public Resolution No. 11-74th Congress).

CONSTRUCTION

County	Deposit Required	Type	Miles
Clinton & Franklin.	$9,900.00	18' gravel, bit. treated.	7.22
Delaware... (Cons. & recons.)	21,500 00	Bit. mac., pen. method, type 2.	5.40

RECONSTRUCTION

Delaware...	9,700 00	74' girder carrying N. Y. O. & W. R. R., concrete approach.	0.31
Tompkins..	9,500 00	5 span I-beam, elim. structure over L. V. R. R. Total length 243' 4", MM 3 appr.	0.45

Maps, plans, specifications, and estimates may be seen and proposal forms obtained at the office of the Division of Highways, Albany, N. Y., and at the office of the District Engineers in whose district the roads are located, upon the payment of Five Dollars ($5.00) for plans and proposal forms. Standard specifications are Two Dollars ($2.00) per copy. No refund will be made on plans, specifications, or proposal forms. Plans and proposal forms may also be seen at the office of the State Department of Public Works, State Office Bldg., Worth & Center Streets, New York City. The addresses of the District Engineers and the counties in each district will be furnished upon request.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement. The attention of bidders is also directed to the special provisions covering sub-letting or assigning the contract and to the use of domestic materials, when let under the rules and regulations for carrying out the provisions of the Emergency Relief Appropriation Act of 1935 (Public Resolution No. 11-74th Congress) for the purpose of providing employment and hastening industrial recovery.

Proposal for each highway or contract must be submitted in a separate sealed envelope with the name and number of the highway plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check, payable to the order of the New York State Department of Public Works, Division of Highways, for the sum as specified in the advertisement for proposals and the proposal itself for each project. The retention and disposal of such cash, draft or check by the State Division of Highways shall conform with Sub. 2, Sec. 38 of Highway Law, as amended. The successful bidder will be required to execute the contract and comply in all respects with Sec. 38 of the Highway Law, as amended. The amount of the certified check accompanying the proposal of the bidder to whom the contract is awarded will be returned when ten percentum of the work under the contract has been completed. If Surety bond is dispensed with, in pursuance to the Highway Law, the amount of the bidding check will be returned when fifteen percentum of the contract work has been completed.

On contracts with federal funds, when optional types are permitted for any one item of work, contractors must state in the space provided in the proposal for this purpose the exact designation of the optional type upon which the proposal is predicated. No one proposal shall contain more than one bid for an optional item. The award, if made, will be on the basis of the responsible proposal which for all items of work gives the lowest total cost for the project and the contract will call for the type designated in such proposal.

Skilled, Intermediate Grade, and Unskilled Labor on all projects shall receive the minimum wage rate per hour as follows:

In New York City: Skilled Labor, eighty cents per hour; Intermediate Grade Labor, sixty-five cents per hour; Unskilled Labor, fifty-five cents per hour;—in the Counties of Nassau, Rockland, Suffolk and Westchester: Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, sixty cents per hour; Unskilled Labor, fifty-five cents per hour;—in the Counties of Dutchess, Orange, Putnam, Ulster & Sullivan, seventy-five cents per hour for Skilled Labor; Intermediate Grade Labor, Fifty-five cents per hour; Unskilled Labor, fifty cents per hour; and in all other counties other than above, Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, fifty-five cents per hour; Unskilled Labor, Forty-five cents per hour.

The minimum hourly rate of wages for the various types of operations and trades, as well as the hours of work and conditions of employment, shall be set forth under the Special Provisions in the itemized proposal for each project.

In conformity with the provisions of Section 220, Sub-division d, of the State Labor Law, as amended, the minimum hourly rate of wages has been established and is annexed to and forms a part of the specifications for the project, and may be ascertained upon reference to the proposal for the project itself.

The right is reserved to reject any or all bids.

FRED'K STUART GREENE,
Supt. State Dept. Public Works.

Bids: January 19.

Bridge

STATE DEPARTMENT OF PUBLIC WORKS, DIVISION OF HIGHWAYS, ALBANY, N. Y.

Pursuant to the provisions of Chapter 63 Laws of 1936, Chapter 867 Laws of 1923, Chapter 348 Laws of 1926, and amendments thereto, and Chapters 465 and 542 Laws of 1936, sealed proposals will be received by the undersigned from prequalified bidders at the State Office Building, 13th Floor, Albany, N. Y., until one o'clock p.m. on the 19th day of January, 1937, for the following work:

Contract No.	County	Type	Name	Approx. miles
W.F. 36-4	Queens.	Multiple plate, girder bridge & misc. work.	Sixty-ninth rd., intramural drive separation.	0.26
W.F. 36-5	Queens.	7 span plate girder. total length 386' & misc. work.	Horace Harding blvd., Meadow Lake-Parkway separation.	0.12
W.F. 36-6	Queens.	Steel sheet pile bulkhead.	Boat basin at .... Flushing Bay.	

The amount of the deposit required is $7,500.00, $28,000.00 and $14,000.00 respectively.

Maps, plans, specifications, estimates, qualification forms and proposal forms may be seen and obtained from the office of the Superintendent of Public Works, State Office Building, Albany, N. Y., and at the office of J. J. Darcy, District Engineer, 122 West Main Street, Babylon, N. Y., upon the payment of $5.00 for plans, proposals, and qualification forms. Standard specifications are $2.00 per copy.

Pursuant to the provisions of Chapter 465, Section 11, and Chapter 542 of the Laws of 1936, the Superintendent of Public Works will prequalify bidders.

No proposals will be considered unless accompanied by a duly issued certificate of qualification.

Forms for qualification of bidders giving evidence satisfactory to the Superintendent of Public Works of sufficient facilities, equipment, experience, and financial backing to insure the completion of the work, according to schedule, will be issued with the proposal forms and must be filled in, sworn to and filed in the office of the Department of Public Works, State Office Building, Albany, New York, before one o'clock p.m., on the 11th day of January, 1937.

A certificate of qualification or a notice that his qualifications are not satisfactory will be mailed to the proposed bidder within 5 days thereafter.

Special Attention of Bidders is called to the separate pages in the proposal entitled, respectively:

"Notice to Bidders" (Prequalifications)"

"Provisions for Cancellation and Completion"

"Liquidated Damages and Additional Costs for Early Completion"

Proposal for each contract must be submitted in a separate sealed envelope with the name of the project plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check, payable to the order of the New York State Department of Public Works, Division of Highways, for the sum as specified in the advertisement for proposals and the proposal itself for each project. The retention and disposal of such cash, draft or check by the State Division of Highways shall conform with Subdivision 2 of Section 38 of the Highway Law, and shall also be subject to retention by and forfeiture to the State of New York as liquidated damages in accordance with the provisions of the last paragraph on the separate sheet of the proposal entitled "Notice to Bidders" (Prequalifications)."

Skilled Intermediate Grade, and Unskilled Labor on all projects shall receive the minimum wage rate per hour as follows:

In New York City: Skilled Labor, eighty cents per hour; Intermediate Grade Labor, Sixty-five cents per hour; Unskilled Labor, fifty-five cents per hour.

The minimum hourly rate of wages for the various types of operations and trades, as well as the hours of work and conditions of employment, shall be set forth under the special provisions in the itemized proposal for the project.

In conformity with the provisions of Section 220, Sub-division d, of the State Labor Law, as amended, the minimum hourly rate of wages has been established and is annexed to and forms a part of the specifications for the project, and may be ascertained upon reference to the proposal for the project itself.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement.

The attention of bidders is also directed to the special provisions covering subletting or assigning the contract.

The right is reserved to reject any or all bids.

FRED'K STUART GREENE,
Supt. State Dept. Public Works.

Make Plans Accessible to Distant Bidders

Plans and specifications for inspection by distant bidders may be filed at any of **Engineering News-Record** offices (without charge). Or a sufficient supply may be deposited at such of our offices as seem desirable, subject to your usual requirements in the matter of deposits, etc. (We assume full responsibility for return of plans or deposits). Therefore, Contractors in all parts of the country can bid with equal convenience on contracts advertised in **Engineering News-Record.**

OFFICIAL PROPOSALS

Bids: January 11.

Grade Crossing Elimination

STATE OF NEW JERSEY,
STATE HIGHWAY DEPARTMENT,
TRENTON

Notice is hereby given that sealed bids will be received by the State Highway Commissioner for:

GRADE CROSSING ELIMINATION—
JIMMY LEE CROSSING

For the construction of a grade crossing elimination between Buena-Tuckahoe Road and the Pennsylvania-Reading Seashore Lines, at the Jimmy Lee Crossing, Atlantic County. The work involves construction of a highway bridge of 6 steel spans having a total length of about 400 feet with the necessary approaches, the length of the entire project being about ½ mile. The principal items of construction are:
Estimated:
820 cu. yards. roadway excavation
66025 cu. yds. borrow excavation
8064 sq. yds. surface treated gravel pavement
12620 sq. yds. gravel slope protection
536 cu yds. foundation excavation
1207 cu. yds. concrete
150000 lbs. reinforcement steel
670000 lbs. structural steel

Bids for the above will be received at the office of the State Highway Department, State House Annex, Trenton, N. J., on Monday, January 11, 1937, at twelve o'clock Noon, Eastern Standard Time, and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must submit a revised financial statement and statement of plan and equipment with their bid.

NOTE: The proposed work is a "United States Works Program Grade Crossing Project" under the provisions of the Emergency Relief Appropriation Act of 1935, and is to be performed in accordance with the Special Provisions and Requirements of the United States Department of Agriculture, Bureau of Public Roads, as outlined in the Supplementary Specifications to be made a part of the contract and specifications, which provisions require that labor be employed from the lists furnished by the State Employment Service, 1613 Pacific Ave., Atlantic City, N. J., preference in employment to be given, when they are qualified to those obtained from the public relief rolls. The attention of bidders is directed to the Special Provisions covering subletting or assigning the contract and to the use of Domestic Materials. The minimum wage paid to all unskilled labor employed on this contract shall be 50c per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be 65c per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.20 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made on the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 ,nor more than $20,000 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: E. DONALD STERNER,
State Highway Commissioner.

OFFICIAL PROPOSALS

Bids: January 5.

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS, DIVISION OF HIGHWAYS, ALBANY, N. Y.

Sealed proposals will be received by the undersigned at the State Office Building, 13th Floor, Albany, N. Y., until one o'clock P. M. on Tuesday, January 5, 1937, for the construction and reconstruction of highways and bridges in the following counties, in accordance with the rules and regulations for carrying out the provisions of the Emergency Relief Appropriation Act of 1935 (Public Resolution No. 11—74th Congress).

CONSTRUCTION

County	Deposit Required	Type	Miles
Dutchess	$4,500	61.5' Rigid Frame Sep. structure	
		Graded Approach	0.06
Orange	70,000	Grading and Structures	5.28
Queens	600	Retaining Wall	——
	7,000	Roadside Improvement	——
Sullivan	32,000	20' B. M. Pen. Method, Type 2 incl. 30'	
		Concrete Arch	5.30

RECONSTRUCTION

Chenango	4,000	20'-40' Concrete 8"; 70' Girder carrying N. Y. O. & W. RR.	0.22
Chenango and Otsego	7,900	20' Gravel Calcium Chloride Treated	0.95
Franklin	12,000	20' Concrete 8-7-8	3.06
Ontario	21,000	30'-40' Concrete 8" incl. Ext. of 45° 2" span concrete arch.	5.01
Otsego	18,500	Truss Bridge, Two 110' spans; I-Beam Elim. struct. over N. Y. O. & W. RR., total length 207' Gravel Appr.	0.71
Ulster	2,800	20' MM. 4; roadside improv.	5.10
Wyoming	340	14' span box; gravel appr	0.01
Westchester	11,000	20' Concrete 8-7-8; 20' MM. 4	2.79

Maps, plans, specifications, and estimates may be seen and proposal forms obtained at the office of the Division of Highways, Albany, N. Y., and at the office of the District Engineers in whose district the roads are located, upon the payment of Five Dollars ($5.00) for plans and proposal forms. Standard specifications are Two Dollars ($2.00) per copy. No refund will be made on plans, specifications, or proposal forms. Plans and proposal forms may also be seen at the office of the State Department of Public Works, State Office Bldg., Worth & Center Streets, New York City. The addresses of the District Engineers and the counties in each district will be furnished upon request.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement. The attention of bidders is also directed to the special provisions covering sub-letting or assigning the contract and to the use of domestic materials, when let under the rules and regulations for carrying out the provisions of the Emergency Relief Appropriation Act of 1935 (Public Resolution No. 11—74th Congress) for the purpose of providing employment and hastening industrial recovery.

Proposal for each highway or contract must be submitted in a separate sealed envelope with the name and number of the highway plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check, payable to the order of the New York State Department of Public Works, Division of Highways, for the sum as specified in the advertisement for proposals and the proposal itself for each project. The retention and disposal of such cash, draft or check by the State Division of Highways shall conform with Sub. 2, Sec. 38 of Highway Law, as amended. The successful bidder will be required to execute the contract and comply in all respects with Sec. 38 of the Highway Law, as amended. The amount of the certified check accompanying the proposal of the bidder to whom the contract is awarded will be returned when ten per centum of the work under the contract has been completed. If Surety bond is dispensed with, in pursuance to the Highway Law, the amount of the bidding check will be returned when fifteen per-centum of the contract work has been completed.

On contracts with federal funds, when optional types are permitted for any one item of work, contractors must state in the space provided in the proposal for this purpose the exact designation of the optional type upon which the proposal is predicated. No one proposal shall contain more than one bid for an optional item. The award, if made, will be on the basis of the responsible proposal which for all items of work gives the lowest total cost for the project and the contract will call for the type designated in such proposal.

Skilled, Intermediate Grade, and Unskilled Labor on all projects shall receive the minimum wage rate per hour as follows:

In New York City: Skilled Labor, eighty cents per hour; Intermediate Grade Labor sixty-five cents per hour; Unskilled Labor fifty-five cents per hour; in the Counties of Nassau, Rockland, Suffolk and Westchester: Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, sixty cents per hour; Unskilled Labor, fifty-five cents per hour; in the Counties of Dutchess, Orange, Putnam, Ulster and Sullivan seventy-five cents per hour for Skilled Labor; Intermediate Grade Labor, Fifty-five cents per hour; Unskilled Labor, fifty cents per hour; and in all other counties other than above: Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, fifty-five cents per hour; Unskilled Labor, forty-five cents per hour.

The minimum hourly rate of wages for the various types of operations and trades, as well as the hours of work and conditions of employment, shall be set forth under the Special Provisions in the itemized proposal for each project.

In conformity with the provisions of Section 220, Sub-division d, of the State Labor Law, as amended, the minimum hourly rate of wages has been established and is annexed to and forms a part of the specifications for the project, and may be ascertained upon reference to the proposal for the project itself.

The right is reserved to reject any or all bids.

FRED'K STUART GREENE,
Supt. State Dept. Public Works.

Bids: January 6.

General Construction

CITY OF NIAGARA FALLS, N. Y.
OFFICE OF THE CITY MANAGER

Sealed bids for General Construction, Heating **Plumbing,** and Electrical Work for a Central Alarm Station and Garage will be received by the City of Niagara Falls, N. Y., at the office of the City Manager, until ten o'clock A. M., in the City Hall on January 6, 1937, and then at said City Manager's Office, publicly opened and read aloud one-half hour thereafter.

The information for Bidders, Form of Bid, Form of Contract, Plans, Specifications and Performance Bond may be examined at the office of the City Engineer and copies thereof obtained upon payment of $15.00 for each set. Any bidder, upon returning such set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such set will be refunded $10.00.

The City of Niagara Falls reserves the right to waive any informalities in or to reject any or all bids.

Each bidder must deposit with his bid security in an amount of not less than five per centum (5%) of the base bid in the form and subject to the conditions provided in the Information for Bidders.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

The estimated cost of the work to be performed under the four contracts is $50,000.00.

No bidder may withdraw his bid within 45 days after the actual date of the opening thereof.

W. D. ROBBINS,
City Manager.

Dated December 23, 1936.

U. S. Government

U. S. ENGINEER OFFICE, Mobile, Ala.—Sealed bids, in duplicate, will be received until 11:00 a.m., January 6, 1937, and then publicly opened, for *aerial photography* of areas located along the Locust Fork of the Warrior River and Big Spring Creek in Northeast Alabama and along the Tombigbee River from Demopolis, Alabama, to its source in northeast Mississippi. Further information on application. **(2613)**

PROPOSAL FOR LEVEE WORK, U. S. Engineer Office, 816 U. S. Court House & Custom House, St. Louis, Mo.—Sealed bids, in duplicate, will be received until 11:00 a.m., January 5, 1937, for placing about 22,000 cubic yards of *earthwork in constructing approximately* 4,100 *linear feet of levee* in Sub-district No. 1 of the Hager Slough Special Drainage District, Cass County, Illinois, on the Illinois River. Further information upon application. **(263)**

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U. S. Government

U. S. ENGINEER OFFICE, Clock Tower Building, Rock Island, Illinois.—Sealed bids, in duplicate, will be received at this office until 2:00 p.m., C. S. T., January 19, 1937, and then publicly opened, for furnishing all plant, labor and materials for, and *constructing Dam No. 17*, Mississippi River, about four miles above New Boston, Illinois. Further information on application. (268)

SEALED BIDS endorsed "Bids for Floating Dry Dock, Specification No. 8350" will be received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., and there publicly opened at 11 o'clock a.m., 3 February, 1937, for a *steel floating dry dock* 446 feet long and 68 ft. beam. Circulars for the information of bidders, plans and specifications and other data relating to said floating dry dock and forms of proposal and contract will be issued by the Bureau of Yards and Docks, Navy Department. A deposit in the form of a certified check for $300 payable to the Chief of the Bureau of Yards and Docks, will be required as security for the safe and prompt return of the plans and specifications and other bidder's data. NORMAN M. SMITH Chief of Bureau, 2 November, 1936. (261)

OFFICIAL PROPOSALS

Bids: January 12.

Delaware Aqueduct

CONTRACTS 332 AND 336

Sealed bids will be received by the Board of Water Supply, at its offices, eleventh floor, 346 Broadway, New York, N. Y., until 11 A. M., Eastern Standard Time, on Tuesday, January 12, 1937, for the following two contracts for shafts of the Delaware aqueduct, all as set forth in the specifications: Contract 332, for the construction of Shafts 2, 2A and 3 of the Rondout West Branch tunnel, in the Towns of Wawarsing and Gardiner, Ulster county, New York; Contract 336, for the construction of Shafts 17 Uptake and 17 Downtake of the West Branch-Kensico tunnel, and Shafts 18 Uptake, 18 Downtake, 19 Uptake, 19 Downtake, 20, 21, 22 and 23 of the Kensico-Hill View tunnel, in the Towns of North Castle, Mt. Pleasant and Greenburgh and the City of Yonkers, Westchester county, New York. Shafts 2, 2A and 3 will each be circular in section and 14 feet in diameter inside of the concrete lining, and will be approximately 825, 1,550 and 840 feet in depth, respectively. Shafts 17 to 22, inclusive, will be circular in section with diameters varying from 15 to 19½ feet; Shaft 23 will have an eliptical cross-section 22 feet by 32 feet 2 inches inside the concrete lining. The depths of Shafts 17 to 23, inclusive, will vary from approximately 320 to 670 feet.

At the above place and time the bids will be publicly opened and read. Pamphlets of each contract containing information for bidders, forms of bid and contract, specifications, contract drawings, etc., can be obtained at the office of the Secretary at the above address, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. For further particulars apply to the office of the Chief Engineer at the above address. GEORGE J. GILLESPIE, President, HENRY HESTERBERG, RUFUS E. McGAHEN, Commissioners, Board of Water Supply; JOHN M. CARROLL, Acting Secretary.

Bids: January 4.

Incinerator

CITY OF MIDDLETOWN, CONNECTICUT
PUBLIC WORKS ADMINISTRATION
PROJECT NO. CONN. 1233R
CONTRACT NO. B-4

The City of Middletown, Connecticut, invites sealed proposals for the construction of a Garbage and Refuse Incinerator, with housing to be received by Superintendent of Public Works, Samuel C. Cannon at the City Chambers, Municipal Building, Middletown, until 8:30 o'clock P.M., January 4th, 1937, and then at said place publicly opened and read aloud.

Bid security in the amount of not less than 5 per cent of the aggregate bid, in the form and subject to the conditions given in the Information for Bidders, shall be deposited with each bid.

The Information for Bidders, Specifications, Plans and Forms of Proposal, Bid Bond, Contract and of Performance Bond may be examined at the office of the Superintendent of Public Works, Middletown, or Thomas F. Bowe, Consulting Engineer, 110 William Street, New York, and sets thereof obtained on deposit of $25.00, which deposit will be fully refunded to bidders returning the sets promptly in good condition.

Owner reserves the right to waive any informalities in, or to reject any or all bids, and no bid may be withdrawn prior to 30 days after the date of opening thereof.

Attention is specially called to the requirements as to conditions of employment to be observed, minimum rates of wages to be paid, and to secural of manual labor by referral from the United States Re-employment Service, or by such agency as the Works Progress Administrator may direct.

THE MAYOR AND COUNCIL, CITY OF MIDDLETOWN
By
RICHARD E. MYLCHREEST,
Chairman, Public Works Committee.
Dated December 21st, 1936.

OFFICIAL PROPOSALS

Bids: January 8.

47th Street Subway and Inner Drive Grade Separation Bridge

Sealed proposals endorsed "Proposal for 47th Street Subway and Inner Drive Grade Separation Bridge" will be received by the Secretary of the Chicago Park District in the Administration Building of the District in Burnham Park, Chicago, Illinois, until two o'clock (2:00) P.M., Central Standard Time, January 8, 1937, and will be opened and read publicly by the Commissioners of said District, at such time and place.

These proposals are invited for the furnishing of all necessary labor and material, for having and using all necessary tools and equipment and for the doing of all the work necessary to construct (1) a complete subway extending East 47th Street under the tracks and across the right of way of the Illinois Central Railroad Company, (2) a grade separation bridge at the intersection of Leif Eriksen Drive and East 47th Street extended, (3) certain sewer work in connection with the subway and (4) items incidental to said projects.

Among the items involved are excavation and backfill, caissons, piles, reinforced poured and precast concrete, structural steel, concrete incasement of steel, waterproofing, drain pipes and sewers, electrical equipment, curbs and gutters and grading.

This work is financed in part by a grant of the Federal Emergency Administration of Public Works. All employees directly employed on this work shall be paid wages in no case less than the predetermined scale of wages included in the specifications.

Proposals shall be made upon blank forms furnished by the Chicago Park District. These forms, plans and specifications may be examined at the office of the Chief of the Purchasing Division of said District and may be obtained upon the deposit of Fifty Dollars ($50.00) for each set (consisting of the forms, specifications and plans).

Upon the return, intact, of said documents, within ten days after an award of contract or the rejection of proposals, refund in full will be made of the deposit for one set. A refund of forty dollars ($40.00) for each additional set will be made. The amount retained on each additional set will be that necessary to cover cost of blue-printing or otherwise duplicating the drawings for the set.

Unless the Chicago Park District elects to reject all bids, the award of the contract will be made to the lowest responsible bidder.

A certified check made payable to the order of the Chicago Park District or cash in the amount of five (5) per cent of the aggregate amount of the bid must be deposited by each bidder with his bid as a guaranty that in case the contract is awarded to him he will, within ten days thereafter, execute such contract and furnish a satisfactory performance bond. On failure to do so he shall forfeit the deposit as liquidated damages and not as a penalty. No bidder may withdraw his bid for a period of thirty days after the date set for the opening thereof. The deposited cash or checks of all except the three lowest formal bidders will be returned within ten days after the opening of bids, and the remaining checks or cash will be returned when the executed contract is approved.

The successful bidder will be required to furnish a performance bond in the amount of the contract, satisfactory to the Chicago Park District.

Chicago Park District,
By: E. A. JULIUS,
Chief of the Purchasing Division.
Date December 18, 1936.

MANY prominent contractors find our "Coast-to-Coast Service" of great advantage to them. It works!
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Hartford, Conn.
CONTRACT BONDS FOR RESPONSIBLE CONTRACTORS
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OFFICIAL PROPOSALS

Water Supply System, Sewer System and Sewage Treatment Plant

TOWN OF NORFOLK, N. Y.
NORFOLK WATER AND SEWER DISTRICTS P. W. A. DOCKET NO. N. Y. 1288-RS

Sealed proposals for furnishing all labor, equipment and materials necessary for the construction and installation of a water supply system, a sewer system and sewage treatment plant in the Norfolk Water and Sewer Districts will be received by the town board of the town of Norfolk, St. Lawrence County, N. Y., at the town hall, Norfolk, N. Y. until 11 A. M. Eastern standard time on Saturday, January 23, 1937, at which time they will be publicly opened and read aloud.

The estimated cost of construction for Contract #2 is $149,699 and for Contract #3 is $8,500, (Contract #2 is general construction and Contract #3 is for steel tank).

The Information for Bidders, Form of Bid, Form of Contract including general conditions and the Specifications, and the Plans, the Form of Performance and other surety bonds may be examined at the office of the town clerk and copies thereof may be obtained from the William T. Field Engineers, Inc., Watertown, N. Y., upon deposit of ten dollars ($10.00) for each set, to be refunded to bidders and intending bidders upon return of the plans and documents within thirty (30) days after the opening of bids.

The town board reserves the right to waive any informalities in, or to reject, any or all bids.

Each bidder must deposit with his bid, security in the amount of not less than five per centum (5%) in the form and subject to the conditions provided for in the information for bidders.

The successful bidder will be required to furnish a performance bond in such form and having as surety thereon such surety company or companies as are approved by the town board and said state director in the amount of not less than 100 per cent of the total amount of the accepted bid.

This contract is to be financed wholly or in part by a loan and grant by the Federal Emergency Administration of Public Works.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under this contract.

No bidder may withdraw his bid within 45 days after the date set for the opening thereof, but may withdraw it at any time prior to the scheduled closing time for the receipt of bids.

Dated, December 28, 1936.

The William T. Fields Engineers, Inc.,
Consulting Engineers,
Watertown, N. Y.
Town of Norfolk, N. Y.
WILLIAM E. BROWN,
Supervisor.

U. S. Government

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., December 15, 1936.—Sealed proposals in duplicate will be publicly opened in this office at 1:00 p.m., January 14, 1937, for *construction of the U. S. P. O. at Greensboro, Ala.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, two sets of drawings and specifications will be supplied free to each General Contractor interested in submitting a proposal. The above drawings and specifications must be returned to this office Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to Contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any Subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch. (264)

U. S. Government

WAR DEPARTMENT, Office of the Constructing Quartermaster, Sacramento, Calif., Dec. 9, 1936.—Sealed proposals will be received at this office until 2:00 o'clock P. M., Pacific Standard Time, January 15, 1937, and then opened, for *grading of Air Field at Sacramento Air Depot, Sacramento, California*, approximately 930,000 cubic yards. Plans and Specifications may be obtained at the above office upon deposit of $20.00. Make check payable to the Treasurer of the United States. (251)

WAR DEPARTMENT, U. S. ENGINEER OFFICE, 332 Post Office Building, Baltimore, Md.—Sealed bids in duplicate will be received here until 10:00 A. M., E. S. T., January 5, 1937, and then publicly opened for the *Rental of draglines*, hauling units and scrapers, for Flood Control projects of the Susquehanna River at Kingston, Edwardsville, Wilkes-Barre, and Hanover Township, Pa. Further information upon application. (252)

WAR DEPARTMENT, Office of the Constructing Quartermaster, United States Military Academy, West Point, New York.—Sealed proposals will be received at this office until 11:00 a.m. E.S.T., January 6, 1937, and then publicly opened for *alterations and additions to Power Plant*. Deposit of certified check in the amount of $20.00, payable to Treasurer of the U. S., will be required for plans and specifications. Information above address. (259)

U. S. ENGINEER OFFICE, Clock Tower Building, Rock Island, Illinois.—Sealed bids, in duplicate, will be received at this office until 11:00 A. M., C. S. T., January 8, 1937, and then publicly opened, for furnishing all labor and materials, and performing all work for *dredging* approximately 101,300 cubic yards of material other than ledge rock, and approximately 193,100 cubic yards of ledge rock in Pool No. 15, Mississippi River, Rock Island, Illinois. Further information on application. (255)

U. S. DEPARTMENT OF AGRICULTURE, Bureau of Public Roads, Washington, D. C., December 12, 1936.—SEALED BIDS will be received at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C., until 11 o'clock a.m., E.S.T., January 14, 1937, for the construction of *Project 3C1*, 4.426 miles of road in the Shenandoah National Park, from Brown Gap to Black Rock Gap, Rockingham, Albemarle and Augusta Counties, Virginia. The approximate quantities of the more important items are as follows: 33 acres clearing and grubbing; 188,550 cu.yd excavation; 5,000 sta.yd. overhaul; 17,000 tons crushed stone for stabilized stone surfacing; 3,200 cu.yd. binder material for stabilized stone surfacing; 43 tons calcium chloride for stabilized stone surfacing; 240 cu.yd. cement concrete; 18,600 lbs. reinforcing steel; 1,600 cu.yd. cement stone masonry; 150 cu.yd. dry rubble masonry; 1,000 sq.yd. rock paved gutter; 2,800 in.ft. 18 and 24 inch cast iron culvert pipe or reinforced concrete pipe; 1,000 lin.ft. 6 inch vitrified tile underdrain; 32 drop inlets, 18 and 24 inch; 2,000 culyd. stripping and storing topsoil; 2,000 cu.yd. placing topsoil; 1,250 cu.yd. special disposal of unclassified excavation for structures. Minimum rates of wages which must be paid laborers and mechanics on this project have been fixed by the Secretary of Cabor as required by law. Where plans and specifications are requested, a deposit of $10.00, certified check or cash, will be required to insure their return within 15 days after opening of bids. Checks must be made payable to the Treasurer of the United States. Plans, specifications and proposal forms may be obtained at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C., or Shenandoah Life Insurance Building, Roanoke, Virginia. H. J. SPELMAN, District Engineer. (267)

SEALED BIDS, in triplicate, subject to the conditions contained herein, will be received by the Veterans Administration, Room 764, Arlington Building, Washington, D. C., until 1:30 P. M., February 2, 1937, and then publicly opened for furnishing all labor and materials and performing all work required for constructing and finishing complete at Veterans Administration Facility, Los Angeles, California, Additional Buildings and Utilities. This project consists of one Male Domiciliary Barrack Building No. 212 (containing approximately 880,000 cubic feet), one Male Domiciliary Barrack Building No. 213 (containing approximately 880,000 cubic feet), one Male Domiciliary Barrack Building No. 214 (containing approximately 725,000 cubic feet), one Male Domiciliary Barrack Building No. 215 (containing approximately 725,000 cubic feet), one Female Domiciliary Barrack Building No. 220 (containing approximately 520,000 cubic feet), etc., and the work will include roads, walk, grading and drainage, excavation, reinforced concrete, cut stone, slate stair treads, marble work, terrazzo, floor and wall tile, compressed asphalt tile, waterproofing, metal work, steel stairs, steel cabinets and shelving, tile and built-up roofing, metal studs, metal lathing, plastering, carpentry, accoustical treatment, insulation, insect screens, window shades, painting, glazing, hardware, plumbing, heating, electrical work, electric elevators, outside service connections and distribution systems, and such other items as shown or specified. Separate bids will be received for (I) General Construction; (II) Plumbing, Heating and Electrical Work; and (III) Electric Elevators; all as set forth on Bid Form. Bids will be considered only from bidders who can demonstrate to the satisfaction of the Veterans Administration that they are competent technically and financially to perform the work, and the ability of a bidder to obtain a performance bond shall not be regarded as the sole test of such bidder's competency. At the discretion of the Administrator, drawings and specifications may be obtained by contractors interested in submitting bids direct to the Veterans Administration, upon application in writing to the Construction Service, Room 764, Arlington Building, Washington, D. C., or to the Supervising Superintendent of Construction, Veterans Administration Facility, Palo Alto, California. One set will be furnished Builders' Exchanges, Chambers of Commerce, or other organizations who will guarantee to make them available for any subcontractor or material firm interested. While no deposit will be necessary, return of the drawings and specifications within ten days after date of opening bids will be required. FRANK T. HINES, Administrator. (253)

COMMISSIONERS, D. C., Washington, December 22, 1936.—Sealed proposals will be received at Room 509 District Building until 2:00 p.m., January 12, 1937, and then publicly opened, for construction, etc., of *Additions to Water Distribution System*, at site of District of Columbia Tuberculosis Sanatoria, Adult Unit, near Glenn Dale, Prince Georges County, Maryland. A more complete description of the work and full information for bidders is given in the drawings, specifications, and in other contract papers, which may be obtained at Room 427 District Building upon deposit of a CERTIFIED CHECK payable to the COLLECTOR OF TAXES, D. C., in the sum of TEN DOLARS ($10.00) to insure return in good condition. Not more than three (3) complete sets of drawings and specifications and contract papers will be furnished to any one general contractor. No proposal will be accepted unless accompanied by a guaranty of not less than five per cent (5%) of the amount of the bid in the form of a certified check made payable to the Collector of Taxes, D. C., U. S. Bonds, or the bond of an approved surety company. Security for the faithful performance of the work shall be in the form of a surety bond in a penal sum equal to the estimated total contract price. A labor bond in an amount equal to the largest estimated aggregate payroll for any one month is required. Public liability insurance in the sum of $5,000 and $10,000 is also required. A separate bond ($50,000) against damage resulting from demolition of the existing water storage tank will be required. The work called for by this proposal is to be performed in accordance with an agreement dated December 19, 1934, between the Commissioners of the District of Columbia and the Federal Emergency Administrator of Public Works, as amended June 12, 1936, and December 3, 1936, and is subject to the construction regulations and labor provisions of Bulletin No. 2 of the Federal Emergency Administration of Public Works dealing with Non-Federal projects, revised March 1, 1935. The Director of the District of Columbia Employment Center is C. E. Lamson, 480 Indiana Avenue, N. W. The Commissioners reserve the right to reject any or all proposals and to waive informalities as they deem best for the interest of the District of Columbia. Final award of contract is subject to approval of the Federal Emergency Administrator of Public Works. No bidder may withdraw his proposal for a period of thirty (30) days after the date for the opening thereof. Attention is called to the fact that not less than the minimum wage rates prescribed by the Federal Emergency Administration of Public Works must be paid on this project. (265)

OFFICIAL PROPOSALS

Bids: January 7.

Sanitary Sewers, Sewage Treatment Plant and Sewage Pumping Stations

TOWNSHIP OF FLORENCE
BURLINGTON COUNTY
NEW JERSEY

Sealed proposals will be received by the Township Committee at the Town Hall, Florence, New Jersey, until eight o'clock P. M., Eastern Standard Time, on the seventh day of January, 1937, for the construction of Contract No. 1 consisting of approximately 64,175 lineal feet of 8" to 18" terra cotta and cast iron pipe sanitary sewers and Contract No. 2, Sewage Treatment Plant and Pumping Stations, together with incidental work in connection therewith at which time and place said sealed proposals will be publicly opened and read.

Instructions to Bidders, Form of Proposal, Condition, Plans and Specifications and other contract documents may be examined at the office of the Town Clerk, or the Consulting Engineers and one copy thereof may be obtained by each bidder from the Consulting Engineers upon deposit of the sum of Twenty Dollars ($20.00), representing the cost of printing and blue prints, which sum will be refunded to those returning the documents in good condition within ten days after the opening of the bids, provided a formal proposal has been submitted by the bidder.

Proposals shall be enclosed in an opaque envelope addressed to Charles B. Green, Township Clerk, Florence, New Jersey, and plainly marked on the outside "Proposal for the Construction of Sanitary Collecting Sewers and/or Contract No. 2 Sewage Treatment Plant and Pumping Stations" and the name and address of the bidder.

Each bid must be accompanied by a certified check for five per centum (5%) of the amount of the bid, drawn upon an incorporated bank or trust company, payable to the Township of Florence as a guarantee that in case the contract is awarded to the bidder, he will, within five days thereafter, execute such contract and furnish satisfactory Performance Bond. Upon failure so to do he shall forfeit the deposit as liquidated damages and the acceptance of the bid will be contingent upon the fulfillment of this requirement by the bidder. The checks of all except the three lowest bidders will be returned within three days after the opening of the bids and the remaining checks will be returned when the contract is fully executed. No interest shall be allowed upon any such certified check.

No bidder may withdraw his bid for a period of 30 days after the date set for the opening thereof.

The successful bidder shall be required to furnish a Performance Bond in approved form and with sureties satisfactory to the Township Solicitor, Howard Eastwood, which bond shall be in the amount of the contract.

The Chairman and Members of the Township Committee reserve the right to reject any or all bids, and/or to accept the bid that in their judgment will be for the best interests of the Township of Florence.

CHARLES B. GREEN,
Clerk.

Bids: January 18.

Incinerator

INCINERATOR
CITY OF ROCHESTER, NEW YORK

Sealed proposals for General Construction (Contract A), for the construction of a refuse incinerator will be received by the Purchasing Agent at the office of the Division of Purchase and Supply, until eleven o'clock a.m., in Room 35, City Hall, Rochester, New York, Monday, January 18, 1937, and then at said office publicly opened and read aloud.

A brief description of the refuse incinerator is as follows:

A steel frame, brick and concrete building, approximately 99 ft. long, 58 ft. wide and 66 ft. high, with a one-story section approximately 99 ft. long, 46 ft. wide and 22 ft. high; two furnaces; two boilers of approximately 420 hp. each; a chimney about 250 ft. high; and all appurtenances.

The instructions to Bidders, Form of Proposal, Form of Contract, Drawings, Specifications and Forms of Performance Bond and guarantee and Maintenance Bond, may be examined without charge at the office of the Division of Purchase and Supply and at the office of Metcalf & Eddy, 1300 Statler Building, Boston, Mass., and copies thereof may be obtained at the office of the Division of Purchase and Supply upon payment of $20 for each set. Any bidder, upon returning such set within 30 days after the opening of proposals, and in good condition, will be refunded his payment, and any non-bidder upon so returning such set will also be refunded his payment.

The City of Rochester, New York, reserves the right to waive any informalities in or to reject any or all proposals.

Each bidder must deposit with his proposal security in an amount of not less than five per centum (5%) of the base bid in the form and subject to the conditions provided in the Instructions to Bidders.

The successful bidder will be required to furnish a performance bond and a guarantee and maintenance bond in such form and having as surety thereon such surety company or companies as are approved by the City of Rochester in amounts of not less than 100% and 10% respectively of the total amount of the accepted proposal.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

The estimated cost of the work to be performed under this contract is $335,960.

No bidder may withdraw his proposal within 45 days after the actual date of the opening thereof.

JOHN G. SCHREINER,
Purchasing Agent,
City of Rochester, New York.

December 22, 1936.

Bids: January 12.

Notice to Scrap Metal Contractors:

JACKSON, MICHIGAN

Sealed bids will be received by the City Commission of the City of Jackson, Michigan, at the office of the City Manager up to 5:00 P. M., Eastern Standard Time, of Jan. 12, 1937, for the sale of scrap steel car rail, fittings, copper bond, bolts and spikes, all of which is now the property of the City of Jackson and is being stocked in the American Fork & Hoe Company yard, Jackson, and the approximate total amount of which is as follows:

2680 ton rail—various sizes.
15 ton scrap bolts
40 ton scrap spikes
5 ton copper bonds and cable

The specifications governing purchase, bidding forms, and copies of contract may be obtained at the office of the City Engineer.

A certified check or bidding bond in the sum of $1,500.00 will be required with each proposal.

The right to accept any proposal, to reject any or all proposals, is reserved by the City.

P. E. CAMPBELL,
City Manager.

Bids: January 14.

THE SANITARY DISTRICT OF CHICAGO

The advertisement heretofore made inviting bids for the equipment hereinafter set forth, which was made on December 15, 1936, has been cancelled and the following advertisement is substituted in lieu thereof.

THE SANITARY DISTRICT OF CHICAGO

Calumet Intercepting Sewer

CONTRACT NO. 17B

Pumping Station

Sealed proposals, endorsed "PROPOSAL FOR CALUMET INTERCEPTING SEWER, CONTRACT 17B, PUMPING STATION," will be received by the Clerk of The Sanitary District of Chicago at the office of said Sanitary District, Room 600, 910 South Michigan Avenue, Chicago, Illinois, until 1:30 P.M., Central Standard Time, on Thursday, January 14, 1937, and will be opened publicly, at 2:00 P.M., Central Standard Time, by the Board of Trustees of said Sanitary District at a meeting to be held on that day or at the first meeting thereafter, prior notice of said subsequent meeting to be mailed to all bidders.

The work for which tenders are invited consists of excavating for and constructing a reinforced concrete and brick pumping station, a new manhole west of the Pump and Blower House, discharge pipe lines from the pumping station to the present surge chamber, the furnishing, erecting and installing of three sewage pumps, one sump pump with all accessories, a bar screen and cleaning device, all piping and valves for the pumps, electric motors and all mechanical and electrical material and apparatus to properly operate the pumping station.

The successful bidder will not be permitted to start the excavation before March 15, 1937, and will be required to start on that date or as soon thereafter as weather conditions permit as determined by the Engineer.

The site of the Pumping Station is adjacent to the North of the Pump and Blower House of the Calumet Sewage Treatment Works Extension, West of Cottage Grove Avenue and North of 130th Street, in the City of Chicago, County of Cook, State of Illinois.

All bids must be made upon blank forms of proposal furnished by the Sanitary District, and shall be made in accordance with and conform to all of the terms and conditions set forth in "Requirements for Bidding and Instructions to Bidders" attached thereto.

Specifications, forms of proposals and general plans may be obtained at the office of said Sanitary District upon deposit of Twenty-five Dollars ($25.00), which sum so deposited will be refunded if said plans and specifications are returned in good condition within thirty days following the opening of the bids.

Each proposal must be accompanied by cash or a cashier's check or a certified check drawn on some responsible bank doing business in the City of Chicago, in the amount of Fifteen Thousand Dollars ($15,000.00), payable to the order of the Clerk of The Sanitary District of Chicago.

This work is under the supervision of the Federal Emergency Administration of Public Works and all provisions of Bulletin No. 2 (Revised March 1, 1935), must be strictly complied with.

The Board of Trustees of The Sanitary District of Chicago reserves the right to reject any or all proposals.

THE SANITARY DISTRICT OF CHICAGO,
By
ROSS A. WOODHULL,
Chairman of Its Committee on Finance.

Attest:
JAMES J. SULLIVAN,
Clerk.

Chicago, December 22, 1936.

U. S. Government

U. S. DEPARTMENT OF AGRICULTURE, Bureau of Public Roads, Washington, D. C., December 19, 1936. SEALED BIDS will be received at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C., until 11 o'clock a. m. E. S. T., January 21, 1937, for the *construction of Project 1A2*, 0.192 miles of road in the Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park, Spotsylvania County, Virginia. The approximate quantities of the more important items are as follows: 1,000 cu. yd. stripping and storing topsoil; 2,300 cu. yd. unclassified excavation; 300 lin. ft. 6 inch tile underdrain; 1,170 lin. ft. 12 inch V. C. pipe; 13 drop inlets; 3 manholes; 1,725 lin. ft. concrete curb; 190 lin. ft. concrete curb and gutter; 2,600 sq. yd. reinforced concrete base course; 100 sq. yd. reinforced concrete pavement; 500 sq. yd. brick sidewalk and cinder base; 300 tons Type H-1 asphalt concrete pavement, liquefier type; 350 lin. ft. hurdle fence; 120 lin. ft. picket fence; 1,000 cu. yd. placing topsoil; and 250 cu. yd. furnishing and placing topsoil. Minimum rates of wages which must be paid laborers and mechanics on this project have been fixed by the Secretary of Labor as required by law. Where plans and specifications are requested, a deposit of $10.00, certified check or cash, will be required to insure their return within 15 days after opening of bids. Checks must be made payable to the Treasurer of the United States. Plans, specifications and proposal forms may be obtained at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C., or National Park Service, Administration Building, Fredericksburg, Virginia. H. J. Spelman, District Engineer. (272)

OFFICIAL PROPOSALS

Bids: January 11.

Bridge Conversion

STATE OF NEW JERSEY,
STATE HIGHWAY DEPARTMENT,
TRENTON

Notice is hereby given that sealed bids will be received by the State Highway Commissioner for:

SHARK RIVER BRIDGE CONVERSION—ROUTE 35

For the conversion of the existing main span across the South Channel of Shark River on Route 35 between Avon and Belmar, Monmouth County, into an operating bascule span. The work involves the installation of machinery, electrical equipment, operators house, counterweight, fender system and dredging.

Bids for the above will be received at the office of the State Highway Department, State House Annex, Trenton, N. J., on Monday, January 11, 1937, at twelve o'clock Noon, Eastern Standard Time, and will be opened and read immediately thereafter

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must submit a revised financial statement and statement of plan and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made on the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten per cent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal form and special addressed envelopes will be furnished on application. Bids not enclosed in special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

(Signed) E. DONALD STERNER,
State Highway Commissioner.

Bids: January 14.

Alterations to Bridge

Sealed bids in duplicate for furnishing all labor and materials for and performing all work for constructing alterations to and extension of the existing combination single track railroad and highway bridge over the Atchafalaya River at Simmesport, Avoyelles Parish, Louisiana, will be received at the offices of the Louisiana & Arkansas Railway Company, Shrevesport, La., until 10:00 A.M., January 14th, 1937, and then publicly opened and read. Further information on application to Harrington & Courtelyou, Consulting Engineers, 1004 Baltimore Avenue, Kansas City, Missouri.

U. S. Government

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., De[illegible] 18, 1936.—Sealed proposals in duplicate will be publicly opened in this office at [illegible] P. M., Jan. 21, 1937, for the *construction of the U. S. P. O. at Arlington, Va.* Attention is directed to the special conditions of bidding set forth in the specification. Upon application, one set of drawings and specifications will be supplied free to each General Contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $7 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to Contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any Sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch. (271)

UNITED STATES ENGINEER OFFICE, FIRST DISTRICT, NEW YORK CITY, Room 710, Army Building, 39 Whitehall Street, New York, N. Y. SEALED BIDS will be received until 12 M, January 29, 1937, and then publicly opened, for furnishing all labor and materials and performing all work for *dredging* approximately 112,000 cubic yards, place measurement, of material in Newtown Creek, N. Y. (273)

Engineering News-Record

(Circulation over 24,500 weekly)

prints more than twice as many announcements advertising contracts to be let as appear in any other publication

Practically every form of public work and the furnishing of material and supplies are printed in the Official Proposal Columns of *Engineering News-Record*. They include calls for bids on:

Boilers	Pumps
Bridges	Pumping Plants
Building Alterations	River and Harbor Improvements
Canal Construction	Road Oil
Cast Iron Pipe	Road Building Equipment
Dams	Schools and Public Buildings
Drainage	Sewage Disposal Plants
Dredging	Sewers
Engines	Street Improvements
Excavation	Street Lighting Systems
Filling	Supplies and Material
Filtration Plants	Water Works
Generators	Well Drilling, Etc.
Heating and Ventilating	
Highway Construction	
Paving	

THIS wide use of *Engineering News-Record's* Official Proposal Columns and the rapidly growing recognition of this paper's value as an advertising medium is due to RESULTS—keen competition, lower bids, better work—and savings.

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CIVIL ENGINEER: Varied Duties, Structural Design and conveying equipment to mapping. Furnish sample of drafting and full details. P-626, Eng. News-Rec., 520 No. Michigan Ave., Chicago, Ill.

DRAFTSMAN—Experienced detailing Mill Buildings. Apply giving experience, salary expected and references. Write P.O. Box 666, Plainfield, New Jersey.

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ENGINEER Registered—18 yrs. exp., Gen'l Eng. and Const. Can take full charge Field Surveys any type. Exp. in Const. Br. & Culv., Hys. Canals, Dredging, River Control, Earthwork, Land Development. Some Spanish. Go anywhere, work men any color. Available now. PW-623 Eng. News-Rec., 520 No. Michigan Ave., Chicago, Ill.

CIVIL ENGINEER, married, age 40, having 15 years practical experience in highway design, location and construction. Capable and efficient as draftsman, instrument man, chief of party on location, construction surveys. Concrete inspector, Project Engineer and Resident Engineer. A-1 References. Reasonable salary. Box 1045, Little Rock, Arkansas.

CONSTRUCTION MAN returning from project in South America about Xmas time. Available January 1st. States or foreign service. Fluent Spanish. Good organizer. Engineering background. Producer. Experienced heavy construction and heavy equipment, dams, power plants, bridges, wharf, buildings, industrial plants, structural steel, concrete. PW-604, Eng. News-Record, 330 West 42nd Street, New York City.

CIVIL ENGINEER B.S., L.L.B. Teaching, Surveying, Topographical, Structural. 5, 1, 2, 4 years respectively. PW-627, Eng. News-Rec., 330 West 42nd Street, New York City.

SUPERINTENDENT, 25 years' experience bridges, harbor work, dams, reservoirs, pipe lines, sewerage disposal plants, and all heavy engineering construction. PW-596, Engineering News-Record, 330 West 42d Street, New York City.

SUPERINTENDENT and contractor of several million dollars worth of sewer contracts involving all types of heavy sewer construction wet or dry excavation. Has vast well point experience as the handling of light and heavy equipment. Twenty years experience. Can furnish any references desired as to experience and integrity. PW-619 Eng. News-Rec., 330 West 42nd Street, New York City.

FOR SALE

Transits and Levels

New and used, sale, rent, repair, prompt service. O. Griner, 920 Oak St., Kansas City, Mo.

SALARIED POSITIONS

$2,500 to $25,000

This thoroughly organized advertising service of 27 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details.

R. W. BIXBY, INC.
272 Delward Bldg., Buffalo, N. Y.

Part Time
News Correspondent Wanted
Philadelphia, Pa.

to report proposed work, bids asked, contracts awarded for public and private construction and prices construction materials. Write for further details and give experience and present connections.

Elsie Eaves, *Manager*
Business News Department
ENGINEERING NEWS-RECORD
330 W. 42d St., New York, N. Y.

SPECIAL INSTRUCTION

Examinations for License (C.E.)

Usually require rigid examination in structural engineering design. Preparation for this portion of examinations arranged to suit individual needs. Wilson Engineering Corporation. College House Offices, Harvard Square, Cambridge, Massachusetts.

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Selling Agencies—Sales Executives
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OPPORTUNITY WANTED

DAILY REPORT on new business available in 48 states. Construction projects, industrial and commercial buildings, public works, all types of civil engineering construction reported in proposed, bids asked, and contracts awarded stages. Mailed daily by first class or air mail, $10 per month. $1 additional for air mail. Speeds up sales follow up. Write for sample. McGRAW-HILL CONSTRUCTION DAILY, 330 W. 42nd St., New York, N. Y.

For Rent—Shovel

One 1½ yard diesel high lift shovel, located near Wilkes-Barre, Penna., rates reasonable

H. S. SHAFER
NAZARETH, PA.

For Sale Cheap
Used Cummer 1250 Yard Asphalt Plant
IN GOOD CONDITION
Located in New York Area
The F. D. Cummer & Son Co.
B. F. Keith Bldg. Cleveland, Ohio

WANTED

One 1¼-yard **gas shovel,** one 10-ton **roller with scarifier,** No. 43 **Bull Dozer,** one 220 **compressor,** 1-inch **drill steels,** one **1- or 2-bag mixer.** Equipment must be in A1 condition and located in the eastern parts of the States. No dealers need reply.

W-606, Engineering News-Record
330 W. 42nd St., New York City.

WANTED
Heavy Duty Trailor

Used, with pneumatic tires suitable for carrying 25 ton dragline. Give full particulars and location.

R. B. STEWART
Fort Myers, Fla.

WANTED

CONCRETE PIPE FORMS. 12 to 30 inches diameter. Bell End. Must be in good condition and reasonable.

W-624, Engineering News-Record
330 W. 42 St. New York City

WANTED
Steam Hoist and Boiler

14x16 3-drum and swinger in first class condition. State location and price.

W-625, Engineering News-Record
330 West 42nd Street, New York City

WANT TO BUY

2—4" or 5" **Centrifugal pumps**
1—200 lb. **Jetting Pump**
1—No. 7 **McKiernan Terry Pile Hammer**
1—No. 9 or No. 10 **McKiernan Terry Pile Hammer**
95 tons of 28' to 30' **Steel Sheet Piling**
A. S. WIKSTROM
BOUND BROOK, N. J.

SHOP BUILDINGS
NEW, NEVER ERECTED
5—Units 89'x600' 2—Units 44'x445'
Also GOOD USED Structures
70'x325'; 90'x170'; 50'x200'
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COUNTRY'S LARGEST
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AT GREAT SAVINGS
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Model 400—new 1929—very good condition—has boom and conveyor extensions.

ARROW CONTRACTING CO., INC.
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FOR SALE
1—Lorain 75-B gas shovel
1—Marion 1¾ steam shovel—full crawlers
1—Koehring 301 gas crane
1—16-B Bay City backhoe—full crawlers
1—1¼ yd. Byers shovel-crane combination
2—1 yd. Bucyrus steam shovels—crawlers
Above units all in good condition at attractive prices to prompt buyer
FS-616, Engineering News-Record
330 West 42nd Street, New York City

Standard STEAM *Gage*
LOCOMOTIVE
Six-wheel switcher—Good Condition.
Tender—Coal 11 tons. Water 7,000 Gals.
Weight on Drivers 100,600 pounds
BOSTON IRON & METAL CO.
313 S. Hanover St., Baltimore, Md.

TUNNEL EQUIPMENT
2—Type 20, Conway Mucking Machines.
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24" Gauge Track, Switches and Dump Cars.
16" Blower and Ventube.
Air Compressors, Pipe Line, Etc.
All priced very reasonably.
Southern-Arsenal Public Relief Sewer Project
of Fruin-Colnon Contracting Co.
Foot of President Street
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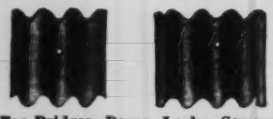

For Bridges, Dams, Locks, Sewers, Disposal Plants, etc.

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BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

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84 Pcs. 12 to 13 ft. Inland 15"x3/8", Sec. 1-31-S.
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Also other lengths and sections at various locations.

No. 1 & No. 2 Vulcan Pile Hammers. Also Pile Extractors.

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800 Tons Lackawanna, Section SP-15 in 20 to 30-ft. lengths. Immediate shipment by rail or water from Kearny, N. J.

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Second Hand Wrought Iron and Steel **PIPE** Overhauled Rethreaded Coupled

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PIPE NEW-USED RECLAIMED FROM 2" To 72"

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Any Size Quantity • SHAPES PLATES

SPECIALISTS—SKETCH WORK—FABRICATION

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of quality repairs! Finest workmanship at reasonable cost guaranteed. Quick service—shipping cases supplied. Rebuilt, new, used instruments for sale. Instruments rented—used instruments bought.

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All makes—all sizes—repaired and regraduated by Factory Experts. The finest work at the LOWEST POSSIBLE COST. Unusually good instruments for sale or rent. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

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Large stocks conveniently located at Atlantic, Pacific and Gulf Points

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"We Buy, Rebuild, Sell or Rent"

AIR COMPRESSORS
Portable and stationary, belt, with elec. or gas power, sizes from 21 cu. ft. to 1000 cu. ft.

BINS
7—Blaw-Knox, Butler & Johnson: 1—117 ton Blaw-Knox with scales; 2—Johnson 76-yd. & 54-yd., 2—Blaw-Knox 72-ton with and without weigh batchers.

BUCKETS
Clamshell, Dragline & Orange Peel buckets; all sizes, all makes.

CARS
Large lot including std. ga. 6 and 12-yd. and 20-yd. 36-ga. 5-yd. and 24-ga. 1½-yd.
16—2 yd. 36 inch ga. Continental 2-way wood body dump cars.
4—30-yd. Clark Standard gauge air dump cars, drop door type.

CRANES (Locomotive)
5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.

CRANES & DRAGLINES
1—Koehring Model 501 dragline, Ser. No. 1070, 45' boom, 1½-yard Omaha bucket.
1—Northwest Model 104 serial No. 2079, 45' boom 1¼-yd. bucket.
2—Northwest Model 105 serial No. 756 and 2053, 40' boom, 1-yd. bucket.
1—Link-Belt Model K-1 crane, shop No. 1024, 50' boom, ¾-yd. bucket.
1—Osgood heavy duty dragline serial No. 2069, 40' boom, ¾-yd. bucket.
1—Industrial Brown Hoist type CC No. 5071, 30' boom, ¼-yd. bucket.
1—Byers Bearcat crane, model 26, Ser. No. 20474, half circle swing, ⅜-yd. bucket.
1—Erie type B-2, serial No. 3300 steam crane, 40' boom, 1 yd. bucket.

DERRICKS
2—10 ton steel stiff legs, 80' boom; 1—Insley, 1—American.
3—20 ton American steel Guy derricks, 100' booms.
3—6 ton Bedford steel guy derricks, 80' booms.

HOISTS
95—electric, gasoline, steam hoists from 5 to 150 HP, single, double or 3-drum, some with attached swingers; all standard makes.

LOCOMOTIVES
2—Plymouth standard gauge gas. locos., 1—20-ton Model HL, Ser. No. 2351; 1—12-ton Model JLB, Ser. No. 2308.
1—Steam saddle tank locomotive, 24-ton Porter, cyl. 12x16", standard ga. Ser. No. 5093.
2—Whitcomb 4-ton 24" ga. double motor battery driven locomotives No's 2017-8 with battery boxes and charging equipment.

PUMPS
7—Dayton Dowd 12" and 8" vertical electric centrifugal pumps.
220—Pumps all sizes, types, and capacities.

SHOVELS
1—Lorraine 75-D 1¼-yd. shovel No. 4653 and with pull shovel attachment.
1—Osgood heavy duty Serial No. 2069, 1-yd. gas shovel.
3—Link Belt shovel attachments for K-55, K-44, K-42, K-38, K-2 machines.

"Send for our New Stock List."

EQUIPMENT CORPORATION OF AMERICA
PHILADELPHIA—P. O. Box 5471, Kingsessing Sta. Phone Granite 7600
CHICAGO—1155 S. Washtenaw Ave. Phone Nevada 2400
PITTSBURGH—P. O. Box 933 Phone Federal 2000

18 inch
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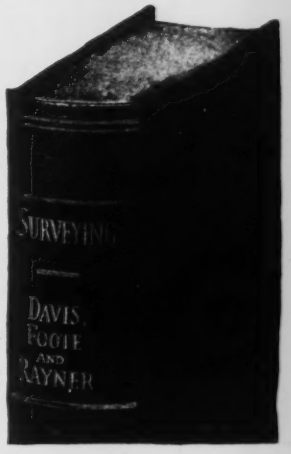

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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)

Recorders, Liquid Level, Remote Control
Bailey Meter Co.

Recording Instruments
Bailey Meter Co.

Reinforcing Metal for Concrete Work
Ryerson & Son, Inc., Jos. T.

Riveting Hammers
Ingersoll-Rand Co.

Road Machinery
Austin-Western Rd. Mchry. Co.
Caterpillar-Tractor Co.

Road Rollers
Austin-Western Rd. Mchry. Co.

Roofing
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)

Rope, Wire
Leschen & Sons Rope Co., A.

Scrapers, Dragline
Harnischfeger Corp.
Sauerman Bros., Inc.

Screens, Sand, Gravel & Stone
Smith Engineering Wks.

Second Hand Equipment
(See Searchlight Section)

Sharpeners, Drill Steel
Ingersoll-Rand Co.

Sheets, Iron & Steel
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)
Youngstown Sheet & Tube Co.

Shovels, Power
Austin-Western Rd. Mchry. Co.
Buckeye Tr. Ditcher Co.
Harnischfeger Corp.
Insley Mfg. Co.
Keystone Driller Co.

Slag
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)

Smokestacks
Chicago Bridge & Iron Co.

Spreaders, Bituminous Surface
Barber-Greene Co.
Jaeger Machine Co.

Spreaders, Sand Gravel & Chip
Universal Road Mchry. Co.

Standpipes
Chicago Bridge & Iron Co.

Steel, Alloy
Youngstown Sheet & Tube Co.

Steel Plate Construction
Bethlehem Steel Co.
Chicago Bridge & Iron Co.
Cole Mfg. Co., R. D.
Lancaster Iron Wks., Inc.

Steel Rock Drill
Timken Roller Bearing Co.

Steel Sheets
Youngstown Sheet & Tube Co.

Steel, Structural
American Bridge Co. (U. S. Steel Corp. Sub.)
Belmont Iron Works
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)
Fort Pitt Bridge Works
Jones & Laughlin Steel Corp.
Mount Vernon Bridge Co.
Phoenix Bridge Co.
Ryerson & Son, Inc., Jos. T.

Steel, Tool
Bethlehem Steel Co.

Tampers, Tie
Elec. Tamper & Equip. Co.

Tanks
American Bridge Co. (U. S. Steel Corp. Sub.)
Chicago Bridge & Iron Co.
Cole Mfg. Co., R. D.
Lancaster Iron Wks., Inc.

Ties
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)

Tools, Hand
Greene, Tweed & Co.
Snap-On Tools, Inc.

Tools, Pneumatic
Ingersoll-Rand Co.

Torches, Welding & Cutting
Linde Air Products Co., The

Towers, Radio & Transmission
American Bridge Co. (U. S. Steel Corp. Sub.)

Track, Industrial and Portable
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)
Jones & Laughlin Steel Corp.

Tractors
Austin-Western Rd. Machy. Co.

Tractors, Diesel & Gas
Caterpillar-Tractor Co.
International Harvester Co., Inc.

Tramways
Harnischfeger Corp.
Leschen & Sons Rope Co.

Treads, Safety
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)

Treads, Traffic Bridge, Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Sub.)

Trucks, Motor
International Harvester Co., Inc.

Trusses, Steel Roof
American Bridge Co. (U. S. Steel Corp. Sub.)

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National Tube Co. (U. S. Steel Corp. Sub.)

Tubing, Stainless Steel
National Tube Co. (U. S. Steel Corp. Sub.)

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De Laval Steam Turbine Co.

Turntables
American Bridge Co. (U. S. Steel Corp. Sub.)

Unloaders, Car and Wagon
Haiss Mfg. Co., Geo.

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Darling Valve & Mfg. Co.
Golden-Anderson Valve Spec. Co.
Smith Mfg. Co., A. P.

Vibrators, Concrete
Electric Tamper & Equip. Co.
Munsell Concrete Vibrators

Wagons and Trailers, Dump
Wellman Engineering Co.

Washing Units, Sand, Gravel & Stone
Smith Engineering Wks.
Universal Road Mchry. Co.

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National Water Main Cleaning Co.

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Sika, Inc.

Water Purification
Electro Bleaching Gas Co.
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Welding & Cutting Apparatus
Harnischfeger Corp.
Linde Air Products Co., The
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Welding Gas
Linde Air Products Co., The

Welding Rods & Wire
Harnischfeger Corp.
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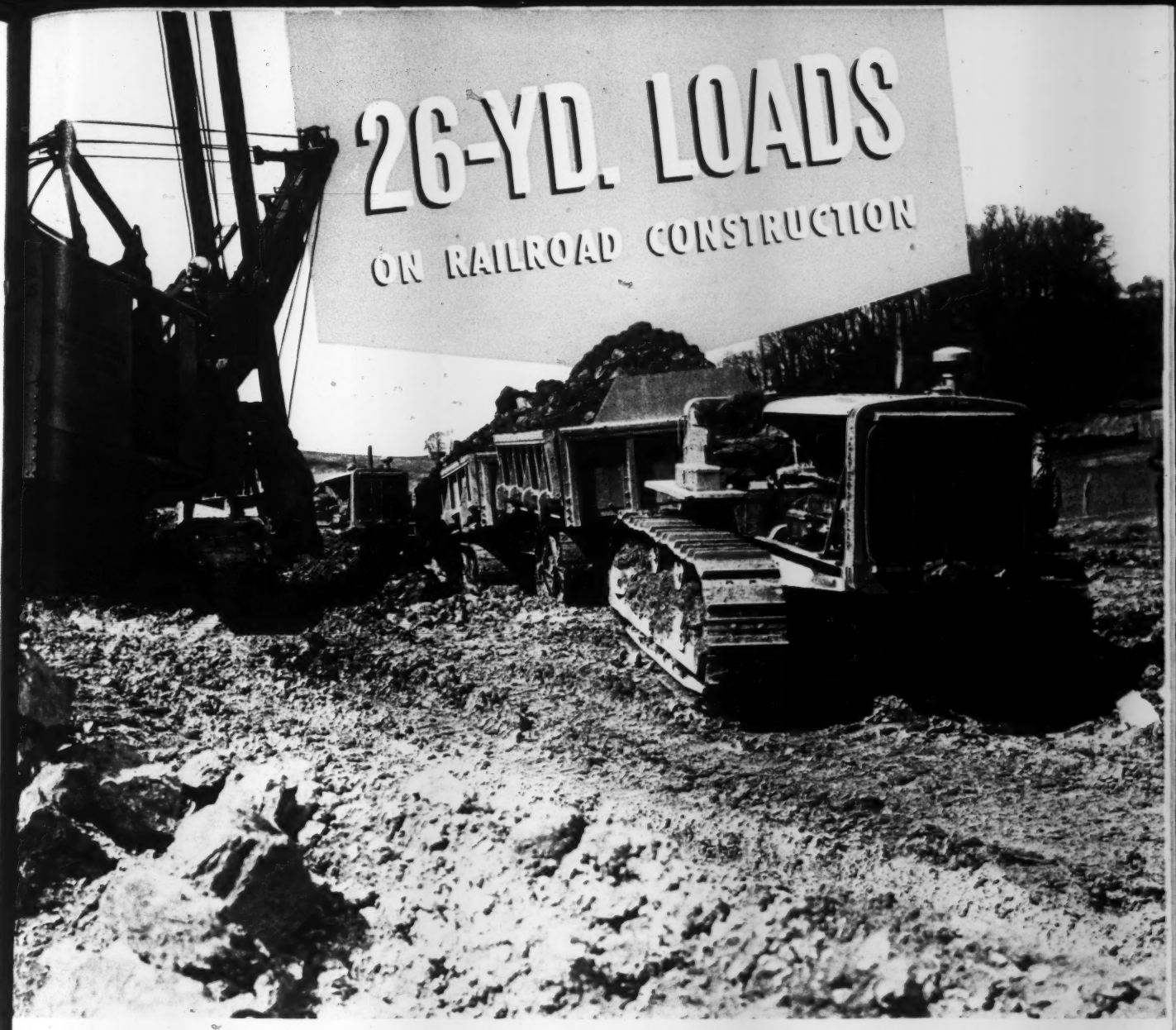

Two 13-yard Athey wagons in tandem is an easy load for each of these big "Caterpillar" Diesel Tractors—carrying dirt from a shovel on hauls up to 6000 ft. These big units cut hauling costs to the bone and keep going regardless of weather and ground conditions—with a full load every trip.

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REG. U. S. PAT. OFF.

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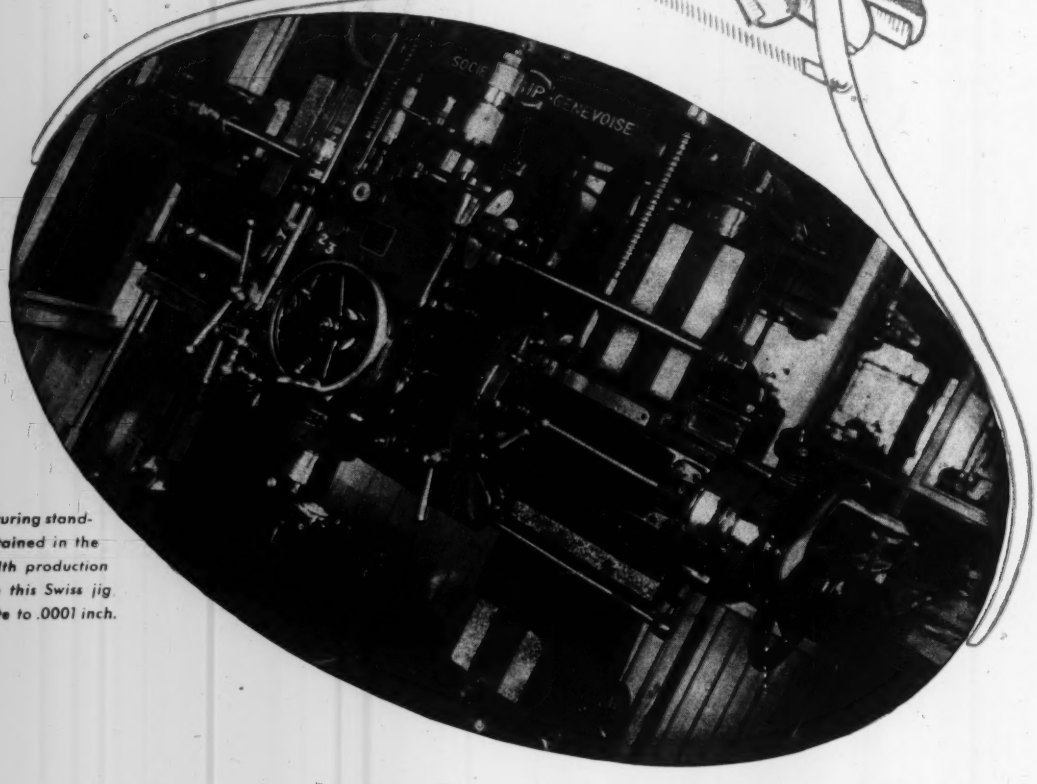

Rigid manufacturing standards are maintained in the W&T factory with production equipment like this Swiss jig borer—accurate to .0001 inch.

THE CHLORINATION DOLLAR MUST BUY . . . UNIFORMITY

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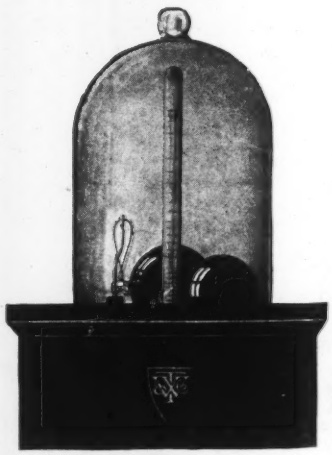
Chlorination, especially of water or sewage, depends upon uniformity. Uniform results, unvarying health protection, can only be achieved with uniform equipment. Standardize on W&T Visible Vacuum Control for uniform accuracy, constant dependability and negligible maintenance expense. Standardized manufacturing methods, rigid inspection, continuous research and assured service all protect your investment.

Tomorrow's taxpayers will be uniform in praising today's selection of W&T Visible Vacuum Chlorinators.

Ask for technical publications 38, 157, and 158



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